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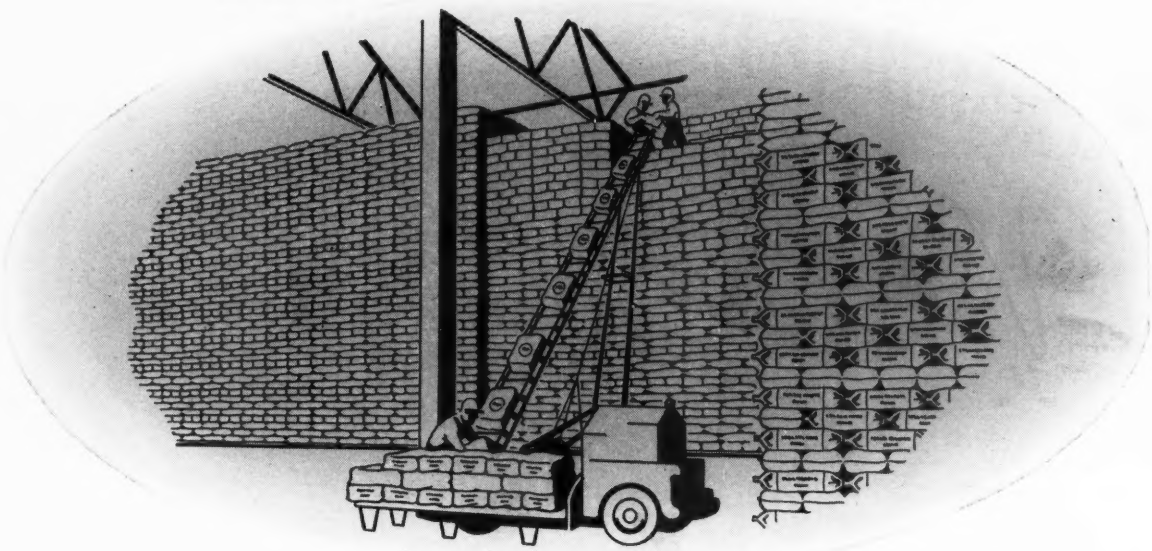
Much more goes into HAMMOND *Multi-Wall* BAGS

than the products they dependably carry



Yes, a great deal more goes into Hammond Multi-Wall Bags than the hundreds of products that are now safely and dependably shipped in them. Here are a few reasons for Hammond's steady growth and for the steadily increasing demand for these Better Bags:

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2. Hammond's two large plants are devoted almost exclusively to Multi-Wall Bag production, placing at your service a highly specialized organization for your shipping bag needs.

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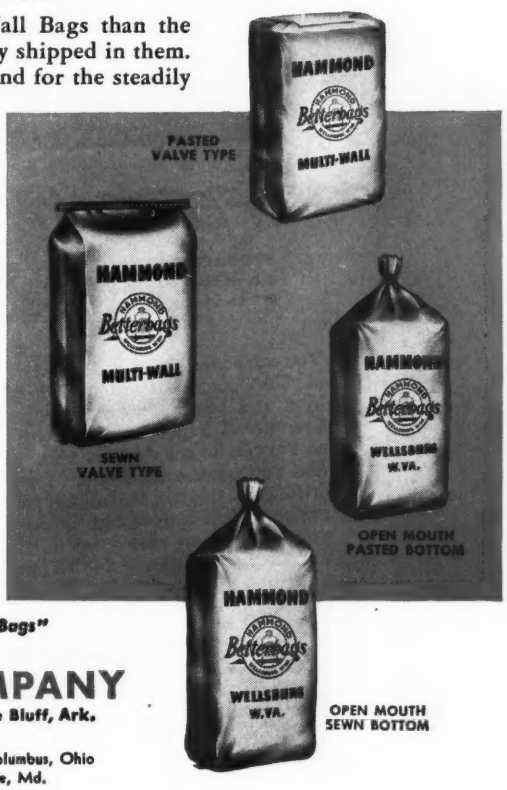

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In this issue . . .

Why bother handling 200 pounds of peat moss when you can condition your ground synthetically with only one pound of material? That's a question most farmers will be asking in a year or two when large scale production of Monsanto's new synthetic soil conditioner "Krilium" goes on the market. The material, the first product of its kind to achieve effective and economical control of rain erosion, is described and illustrated in the article on page 13.

Many advantages are gained by manufacturing sulfuric acid from native sulfur, but, in England particularly, severe difficulties are encountered these days in getting enough sulfur to supply needs for the process. As a substitute, Imperial Chemical Industries Ltd., Billingham Division, is producing the acid using anhydrite as a raw material. The Billingham plant was erected in the early thirties and since has developed into a commercially successful unit. Industry personnel, plagued by the shortage of sulfur, should be interested in the process which is discussed in the article on page 17.

Nearly everybody who knows anything about the subject agrees that only by using modern chemicals can large crop yields be obtained in the United States and elsewhere. Without them, it is thought, the nation's economy would be seriously threatened, if not destroyed. But not everybody agrees about the effect farm chemicals have on humans, as the statements from the Delaney hearings indicate. They appear on page 23.

Accidents are on the increase in fertilizer and pesticide plants, recent statistics indicate. FARM CHEMICALS has been presenting articles on various phases of the safety problem. In this issue, on page 29, we present an article which cites the advantages of a plant safety committee.

One for 12 is the ratio of work saved by using a Select-O-Weigh scale, the company claims. The automatic device, which accomplishes the work formerly requiring 12 separate scales, is described in the back page feature on page 52. Even the smallest plant can afford the instrument, according to the company.

farm chemicals

Formerly
American Fertilizer & Allied Chemicals

Established 1894

PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 115 **JANUARY, 1952** **No. 1**

Contents

Cover Story

A carton of Krilium, Monsanto's new synthetic soil conditioner, will do the work of that big pile of peat moss pictured on the cover. For more details on the conditioner, see the article on page 13.

A magazine international in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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farm chemicals facts

. . . Briefly Noted

Kolker subsidiary of **Diamond Alkali company,** Cleveland, O., has started commercial production of **technical trichlorobenzene** at the Houston, Tex., plant.

The new product has a boiling range of 210 degrees to 230 degrees Centigrade, a specific gravity of 1.463, a freezing point of 8 degrees Centigrade and a pH[e]. It is available in both drum and tank car quantities.

The insecticide field has extensive need for trichlorobenzene, it being particularly effective for termite control. It is used also as a solvent for fats, oils, waxes and resins.

Brazil Export company, of New York, has placed an order for a **60-ton contact sulfuric acid plant** with Chemical Construction corporation, also of New York. The Brazil company wants the plant to utilize a form of pyrite known as "coal brasses" for the raw material.

As another step in an extensive expansion program, the plant will be constructed for the SA Reunidas F. Materazzo, a large South American company which produces synthetic yarn. It will be the third plant erected by Chemico for the client in Sao Paulo. The first, of 25 ton capacity, was built in 1936 and the second, with a 30 ton capacity, was erected in 1950.

Alleviation of the world-wide sulfur shortage is expected to be aided by the new **pyrites-burning plant.**

J. Fred Dudley has been named to the position of chief engineer of Commercial Solvents corporation. Dudley replaces **Homer Kieweg,** who was appointed manager of the central division of the production department.

After joining the organization in 1943, Dudley was promoted in February to assistant chief engineer. He is a member of the American Chemical Society and the American Institute of Chemical Engineers.

The fertilizer section of their plant is being renovated by the installation of a new bin and **batch weigh system,** Chemical Formulators announced.

Indiana farmers are being asked to buy a material known as **Calfide,** the office of the state chemist at Purdue University reports. The material is being sold in several counties as a soil conditioner at prices up to $74.50 a ton. It is not a fertilizer but appears to be from a deposit which contains limestone and gypsum, according to the report.

A. S. Carter, chief inspector for the state chemist, stated both limestone and gypsum are exempt from the Indiana fertilizer law. He urged farmers to use good judgment in the amount they pay for soil conditioning materials.

Raymond C. Crippen research and development laboratories have moved to 1138 East North Ave., Baltimore 2, Md. The enlarged quarters include three floors of modern laboratories for the analysis of agricultural chemicals, development laboratories for new products, organic synthesis laboratories for preparation of new compounds and laboratories for searching for new materials.

Also included in the new facilities are animal labs for study of the **toxic effects of farm chemicals,** a biochemical lab and a small greenhouse for testing the chemicals on plants and insects.

Henry H. Fowler now heads the NPA, which was separated from DPA this month. Fowler had been a deputy administrator of the organization since September, 1951. **Manly Fleischmann** has exclusive authority over DPA.

Sam E. Hardwick Jr., has been appointed sales representative of United States Potash Company, in the states previously served by William B. Porterfield, Jr.

Porterfield has been appointed assistant sales manager of United States Potash Company. He will have headquarters in the New York office of the company.

Died: Harry Lanhorst, manager of the insecticide department of American Cyanamid company's Agricultural Chemicals Division, Jan. 19 after a long illness.

Langhorst had served with the company for 23 years in the insecticide field. He joined Cyanamid in 1929 as an insecticide salesman, was promoted to assistant manager of the insecticide department several years later and was appointed manager in 1947.

New development engineer at Davison Chemical Corp. is **Dr. Ambrose G. Whitney,** who recently joined the research and development department. Dr. Whitney is a graduate of the College of St. Thomas. He received his Ph.D. degree from the University of Minnesota in 1940.

William J. Murray Jr., has been elected to the board of directors of International Paper Company, to fill the vacancy created last year by the death of **Albert H. Wiggin.** Murray is chairman of the board of McKesson & Robbins, Inc., and a director of the Bank of Manhattan Company and General Foods Corporation.

Three personnel changes have been announced by Hercules Powder Company. **Arthur Langmeier** has been named assistant general manager of the Naval Stores department. He formerly was director of operations of that department. **A. H. Reu,** manager of Georgia operations of the Naval Stores department, was named director of operations for the department in Wilmington, replacing Langmeier. **George E. Bosserdet,** general superintendent of the naval stores plant at Klamath, Oregon, will succeed Reu as manager of Georgia operations.

Nitrogen makes good eating!

IT TAKES NITROGEN to turn a steer into steak. It puts weight on beef by increasing both the amount of forage and its protein value. It helps build grazing land that for feeding value can't be beat by any other crop. Whatever the pasture harvest—milk, ham, lamb, or beef—nitrogen makes good eating. And at the same time builds vigorous cover that helps keep the earth in good shape.

Of all the sources of nitrogen, anhydrous ammonia is the most concentrated and the most economical. It is this preferred form that CSC produces at its Sterlington plant in Louisiana. Most of CSC's production is used to increase the value of productive crops from Gulf Coast soils.

AGRICULTURAL DIVISION

COMMERCIAL SOLVENTS CORPORATION

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CSC

The Real Problem

How can American agriculture produce more food on fewer acres of land in the face of increasing shortages?

That's one of the major problems facing agriculture —and the economy of the country as a whole—in these days of ever-increasing demands for more and better food for civilian and military use.

By using farm chemicals, farmers already have made astounding progress in getting more from less—making acres do double duty as the amount of land available for agriculture in the United States decreases.

In testimony before the Delaney committee at recent West Coast hearings, Dr. Paul F. Sharp, director of the California Agricultural Experiment Station, set forth three factors which he said account for our ability to feed more people on the reduced amount of land.

As he stated them, they are:

1. The conversion, on the farms, of horses to tractors has resulted in the release of 60 million acres from the production of feed for horses to the production of food for humans. For all practical purposes this conversion is complete, and we can expect no future gains in land from that source.

2. People are eating much less than formerly, because they are working only about half as hard.

3. The land is producing more as a result of research in the development of new and improved crops, better cultural practices, use of irrigation and fertilizers and better control of diseases, insects and weeds.

Recently there have been many criticisms of the newer pesticides because of their alleged disastrous effect on humans who consume food treated with them.

Testimony before the Delaney committee happily has given strong opposition to these largely unsupported statements. However, all agree that testing of farm chemicals before their use certainly is necessary to determine the dangers inherent in their application to crops.

But unnecessary delays in adoption of new chemicals can do more harm than good.

As Dr. Sharp put it, "We must produce more on less and less land as time goes on. We can do this only by research. . . . Any factor that tends to force us to maintain the status quo should be eliminated."

Dr. Sharp continued, "When a control procedure is developed, a delay of even one year in obtaining permission for its use might bring ruin to a segment of our agriculture and lower the nutritional level of our population. Unnecessary delays in adopting desirable practices should be avoided and any mechanism creating such delays is certainly not in the public interest. . . . Is it not the case that the known hazard of lowering the nutritional level of the people of our country is much more serious and real than the remote chance that a small amount of residue may be present on some fruit?"

With that statement Dr. Sharp has hit on the crux of the problem with which the Delaney committee is concerned.

With all the ill feeling and half-baked charges the Delaney committee may have inspired, it at least has this one important merit: *It has brought out into the open—for public appraisal—concise statistical data on the value of farm chemicals, their use and their effect on plants and animals.*

In addition, some very valuable suggestions for the better control and regulation of chemicals were forwarded at the hearings.

For these two reasons, existence of the Delaney committee has been justified.

It is Dr. Sharp himself who gives one of the most provoking suggestions for breaking the impasse on the use of chemicals on crops.

"One suggestion," he stated, "would be to instruct Food and Drug to grant permission on a tentative basis for the use of new procedures which appear to be desirable in lowering costs, improving the quality of a product from the nutritional standpoint and increasing acceptability to the consumer.

"During the tentative approval period, the new development can be evaluated and a decision made in the light of this evaluation as to whether or not final approval should be given."

For other views on the use of pesticides, not all in agreement, read the article on the Delaney hearings in this issue.

—Hamilton C. Carson

farm chemicals outlook

Report from Washington
by Fred Bailey & Don Lerch

Washington is uneasy. While there is always tension in the Capital during an election year, there is the feeling that tactics in both political camps are going to be rough. This is not going to be "just another election," if the forecasters are even partially correct.

Agriculture is bound to be one of the top domestic issues. Many observers credit Secretary Brannan with bringing home the decisive votes when "everybody knew" Truman couldn't win. This time, the democrats face tough sledding with farm costs expected to rise about 10 per cent and farm prices pinned under ceilings which, in some cases, are being lowered as market prices follow seasonal declines.

Food costs are soaring. Many officials predict still higher prices later this year. The public's food bill reached an all-time high in 1951. Total amount spent for food, including meals eaten out, is estimated at 56 billion dollars . . . up 3½ billion over 1950.

Shortages of some consumer durables will turn more money into the food stores resulting in at least moderate price increases, if the experience of the last war is repeated.

The Administration is perplexed over its inability to resolve rising food prices to consumers and a growing demand for higher price supports from some farm groups.

Washington is regularly treated to the behind-scene battles among spokesmen for the USDA who insist that controls be set only at levels which encourage production, and OPS officials who are out to please the consumer.

The capital would not be surprised to find the Secretary of Agriculture out selling his Brannan plan under a new name. This is the proposal which promises low food prices to consumers and high prices to farmers with the difference made up in taxes.

Some farm organizations expect a new hybrid program with the Brannan Plan crossed with the Family Farm Policy Review, which was completed late last year. Such a move would be the Administration's answer to the quandary.

Congress is not expected to take any major action in the farm field before the election. Look for a little tinkering with price supports, admonishments to mobilizers to keep agriculture supplied with production essentials, but no determined moves by either party.

Economy will be preached, but Congress will practice little of it. It is a political axiom that taxes should not be raised or spending cut in an election year.

No determined effort to kill price controls is expected in Congress. There is general recognition here that prices will be under growing inflationary pressure . . . neither party wants to take the blame for higher prices.

Fertilizer industry is on the spot this Spring. While attention has been centered on production problems, distribution has become the important factor. Farmers in many sections have not ordered or taken early delivery as had been hoped.

Speculation about a shortage last year which didn't materialize is being credited with part of the blame. Unless the situation is corrected, Washington hears that shortages could become acute in some areas. A few manufacturers have considered the possibility of shutdowns unless they can begin to empty their storage bins.

USDA can be expected to help some. The Department is launching an all-out drive to sell the need for increased food production to farmers. Plan proposes the voluntary assistance of public relations men from farm organizations, advertising agencies, commodity groups, and radio farm directors.

Agriculture officials don't want a repeat of last year's performance when they made last-minute trips to the corn belt to plead for more acreage. The 1950 harvest shows they didn't succeed.

Fertilizer can be made an important part of the overall campaign if the industry puts its problem squarely at the Department's doorstep.

Move could multiply industry's own efforts to get the best possible distribution. Problem is not new, but in view of expected record fertilizer demand it may become acute.

Tremendous expansion in nitrogen production can be expected during the next few years. Department officials are jubilant over the new program which would bring nitrogen production for agriculture up to 2,150,000 tons by 1955.

While there are many methods of calculating total production, some officials estimate this could almost double present output for agriculture.

Months of desk-pounding sessions preceded acceptance of the new program by the mobilizers. While the usual problems of translating paper orders into construction materials at plant site are expected, the Department does not anticipate any serious delays in the program. Reason given is that the authorization was made at the "top".

How fast industry picks up the authorizations remains to be seen. Washington believes there is some feeling that the expansion program may be running ahead of the amounts farmers will buy in the mid 50's.

Most officials grant that whether we have a shortage or a surplus of nitrogen in 1955 depends on Russia.

USDA officials are jittery over industry's ability to produce under the recent sulfur orders. General opinion here is the orders messed up standard production practices.

Biggest hitch is over "average monthly allotments" which the Department fears could disrupt normal peak superphosphate production periods in the spring and fall.

Watch for intensified efforts to reduce dependence on sulfur. Mobilizers have about given up hope that Europe will increase sulfur production from pyrites fast enough to relieve export demands upon the U.S. Material relief is not expected within any reasonable time.

This country's sulfur stockpiles are now lower than some defense officials believe safe. It's hand to mouth from here on.

DPA has given the go-ahead for construction of a twenty-million-dollar plant to manufacture superphosphate from nitric acid in place of sulfuric. Research on still other processes is being speeded.

Use of dusting sulfur on cotton east of the Mississippi is being discouraged by the Department. Trouble, as officials see it, is that carry-over mixtures will contain sulfur . . . much of this year's supply won't. Many growers insist on sulfur . . . whether they need it or not.

USDA is placing great hope in the newer organic miticides such as parathion, TEPP and others to control cotton mites. Supply is expected to be good in most areas . . . hazard to the operator is seen as the big problem.

Barring a "quickie" food law this Spring, Washington is betting the Food and Drug Administration will not get its hoped-for new powers over insecticides.

Congress will be under pressure to pass "must legislation" and get home for election campaigns. There is no great clamor for tighter laws pouring into congressional offices.

National Research Council's report showing relative safety of insecticides under present laws is interpreted here as blocking fast action in Congress. Report sets the stage for further debate.

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Lion Ammonium Nitrate Fertilizer — The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

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Krilium

New synthetic soil conditioner marks revolutionary era for farm chemicals

A NEW field for the farm chemicals industry has been opened by the development of a new synthetic organic chemical which is 100 to 1000 times more effective in improving soil structure than compost, manures or peat moss.

The material, called Krilium by Monsanto Chemical Company which developed it, was described recently at the annual meeting of the American Association for the Advancement of Science. It was discussed in a technical symposium at which the soil conditioner was introduced by Dr. C. A. Hochwalt, vice president in charge of research, development and patent activities for the company.

The soil conditioner is the first of its kind to achieve effective and economical control of rain erosion. Krilium was developed as a result of original research by Monsanto and extensive tests for several years. Thirty technical cooperators in various sections of the United States recently tested the material.

Krilium is a synthetic polyelectrolyte—not a fertilizer.

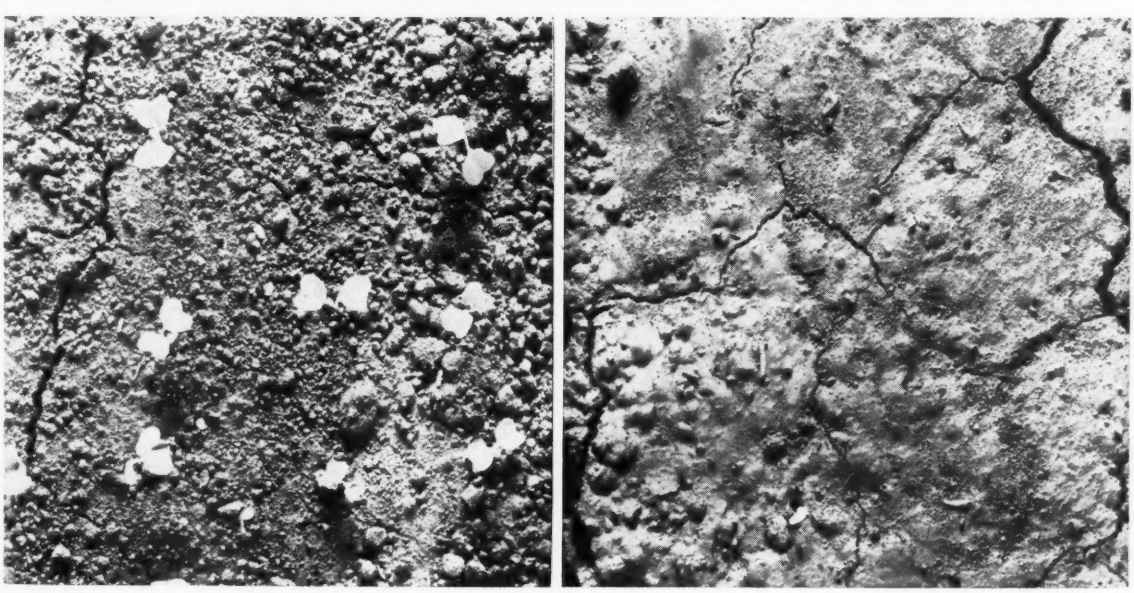
Dr. Hochwalt declared the product is a "chemical soil conditioner which for the first time radically and immediately improves soil structure."

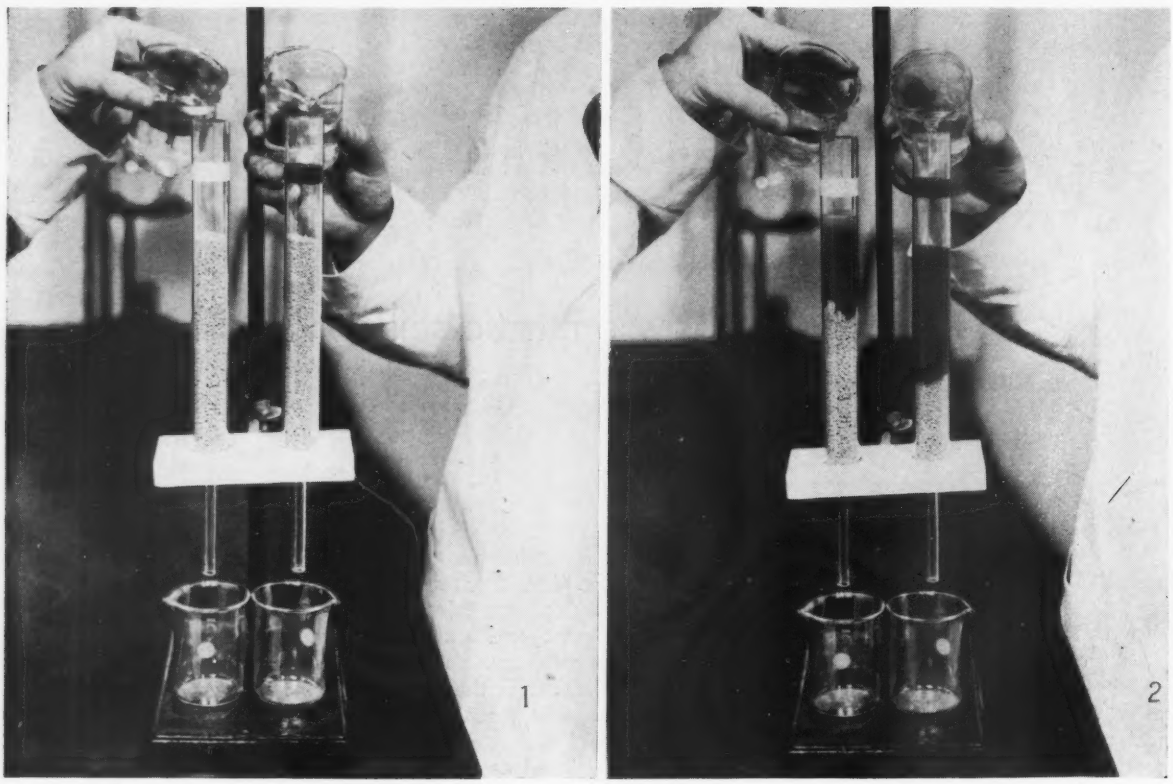
The chemical converts nonproductive into productive soil in a few hours instead of the years required by present methods.

Krilium restores the physical structure of the soil to the correct consistency, allowing plants to obtain the correct amounts of water, oxygen and nutrients from the soil.

Tests carried out by Monsanto and by 80 soil scientists in various parts of the country indicate the soil conditioner marks a revolu-

Radishes planted in untreated soil, right, and in soil treated with Krilium, left, show dramatic contrast in growth. Note sparse germination in untreated soil which shrank and dried to a hard crust from watering. Greater germination resulted in Krilium treated soil which was watered in the same manner as the untreated soil.





This infiltration test, conducted by chemists at Monsanto Chemical Company's Central Research laboratories in Dayton, Ohio, shows how equal amounts of water affect untreated soil, left, and soil treated with Krilium, right.

tionary era in the field of agricultural chemicals.

The new chemical is expected to have wide application in controlling slope erosion problems created by major earth-moving construction projects. This includes highway and railroad construction, housing developments and construction and maintenance of military establishments. Spot erosion problems in farm areas also may be counteracted by use of Krilium, the tests indicate.

Site of Research

Monsanto's Central Research Laboratories in Dayton, Ohio, were the site of the important research that led to the development of Krilium. Federal and state agencies are cooperating with other personnel in the United States to test the material.

Dr. Hochwalt explained it is expected to have wide application "as a soil conditioner in home gardens, truck farms and greenhouses."

"In addition to its other advantages," he said, "the new conditioner is highly resistant to bacterial decomposition."

Additional and detailed information about the value of application of Krilium will be obtained from tests currently being conducted at many locations throughout the country, the research head stated.

A graphic illustration of the value of Krilium is obtained from the statement that one pound of the substance has essentially the same effect on soil structure as 200 pounds of peat moss or 500 pounds of commercial compost. Krilium will sell at less than $2 a pound in its first production stages, the company stated. Current average price of peat moss is four cents a pound, while commercial compost averages approximately two and one-half cents a pound.

Resists Decomposition

In addition to the economy involved in the use of Krilium, the material has the additional advantage of being much more resistant to bacterial decomposition than either peat moss or commercial compost.

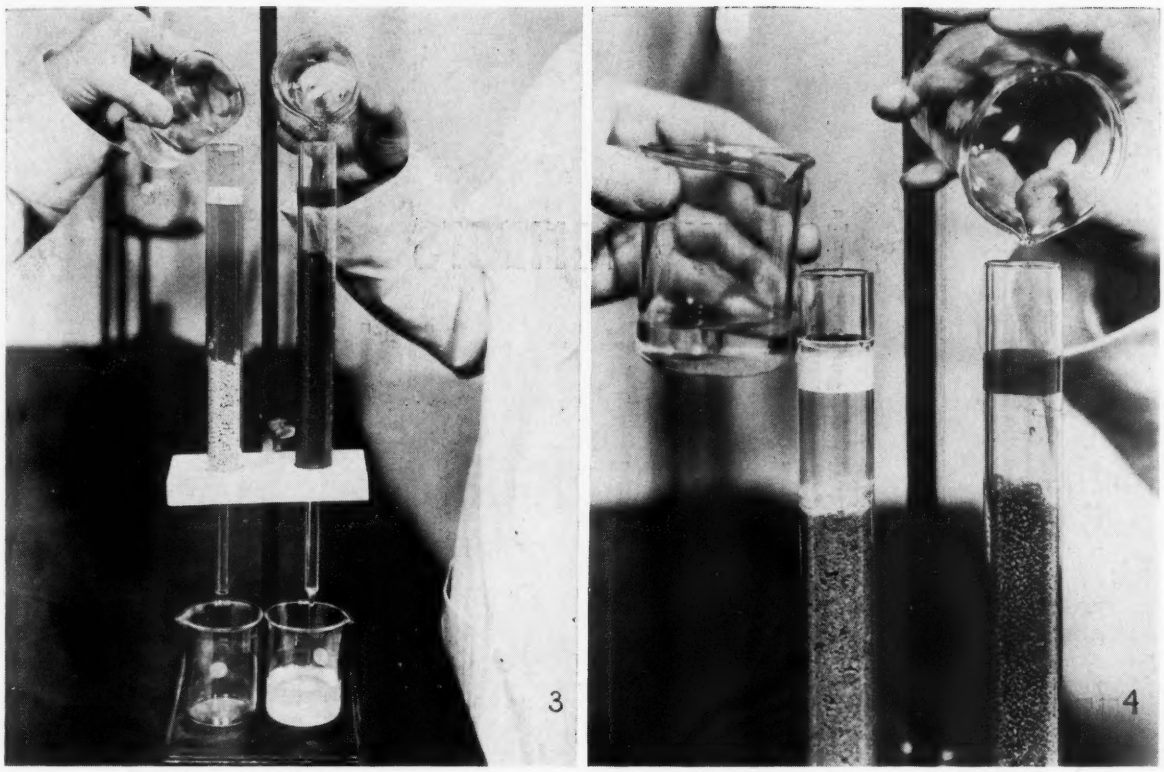
Because of its lasting effect on soil structure Krilium is expected to maintain a longer stand of high value production in crop rotation.

It is a synthetic substitute for the natural humus components which normally are plentiful in virgin, fertile soils, but scarce in many areas of the country. Soil structure—the arrangement of tiny primary soil particles into aggregates with varying stability to water—varies throughout the country.

Helps Aggregation

The main effect of the new chemical is to form and to stabilize natural soil aggregates against the dispersing or slaking action of water. Krilium helps aggregation of poor soils, where the aggregates may range from dust to clods, with low stability to water.

Naturally, untreated soil can be worked into a porous, loose structure by mechanical means but it will not keep this aggregation after rainfall if it is not of good tilth.



Note that untreated soil obstructs the passage of water by slaking and clogging. Soil treated with Krilium lets all the water through, and remains crumbly with no mud. Krilium is a new synthetic soil conditioner.

Poor structure is indicated by a tendency of the soil to slake down to a shiny, smooth, crusty surface, which results in reduced germination of plants.

Other important benefits of Krilium, produced by the material in providing needed aggregation for soils of poor structure, are the following:

Important Benefits

1. Aeration, the process by which plant roots obtain oxygen and utilize nutrients, is greatly increased.

2. Important moisture relationships are improved in well-aggregated soil. Its porous, spongy structure permits a more rapid rate of water infiltration and percolation.

3. An increased ability to hold water against evaporation also is displayed by soil treated with the conditioner.

4. Increased soil workability.

This is one of the most important advantages of using Krilium. Treated soil is much more easily tilled and requires less subsequent working when it is treated with the conditioner, tests have shown. The substance actually changes the tight sticky character of clay soil, and treated soil can be tilled at higher moisture levels in early spring without puddling.

But improving soil structure and increasing plant yields are only two advantages of the material. In addition, it is an effective and economical agent in the control of rain erosion. For this purpose, it merely is spread evenly over the surface. After it becomes wet, Krilium forms a water-permeable film on the surface during the time necessary for establishment of a permanent cover crop.

Seed Germination

Improved conditions for seed germination also are obtained through its use, and subsequent growth of the grass or vegetative cover, which is necessary for permanent protection against erosion.

On the economic side, the advantages of the conditioner are numerous, in comparison with surface mulches now widely used in erosion control.

They include ease of application, lack of flammability, resistance to wind, availability in areas where mulches are not readily obtainable and savings in transportation, storage and application costs because of the relatively small quantity of the substance needed for treatment.

Greenhouse Use

Greenhouse operators, in addition to farmers, will be benefited by using Krilium, tests indicate. It is expected to replace the 30 to 50 per cent crude organic wastes which must be constantly added to poor soils to bring them up to standards.

Dr. Charles A. Thomas, president of Monsanto, said Krilium will be on the market in substantial quantities by next year.

Production of acrylonitrile, the starting material for the conditioner, will be started after completion of a $50,000,000 plant now being built at Texas City, Texas. ◆

British make

Sulfuric Acid

by process which uses anhydrite as raw material in place of sulfur

Reprinted from the September, 1950 issue of The Industrial Chemist, *London, England. Photographs provided by Dr. Higson, of the Imperial Chemical Industries.*

THE principal sources of sulfur for the production of sulfuric acid in Great Britain are native sulfur, which comes almost entirely from the U. S. A., and pyrites which is chiefly obtained from Spain and Cyprus.

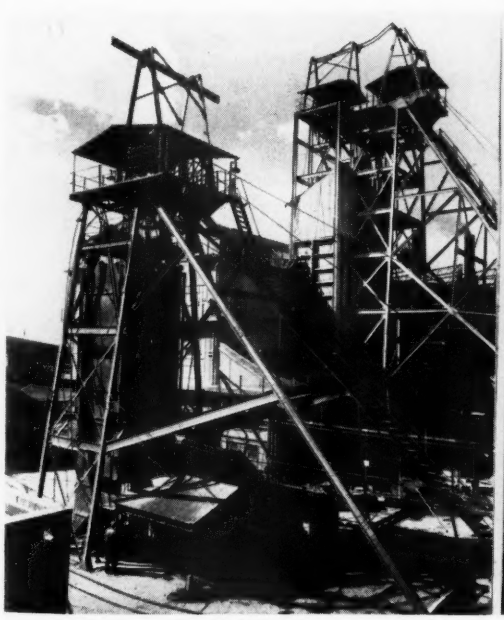
Some sulfuric acid is produced during the smelting of base metals but this is, of course, dependent on the amount of these metals being processed. Yet another source of supply is spent oxide but this is practically fully used at the present time and does not offer any place for expansion.

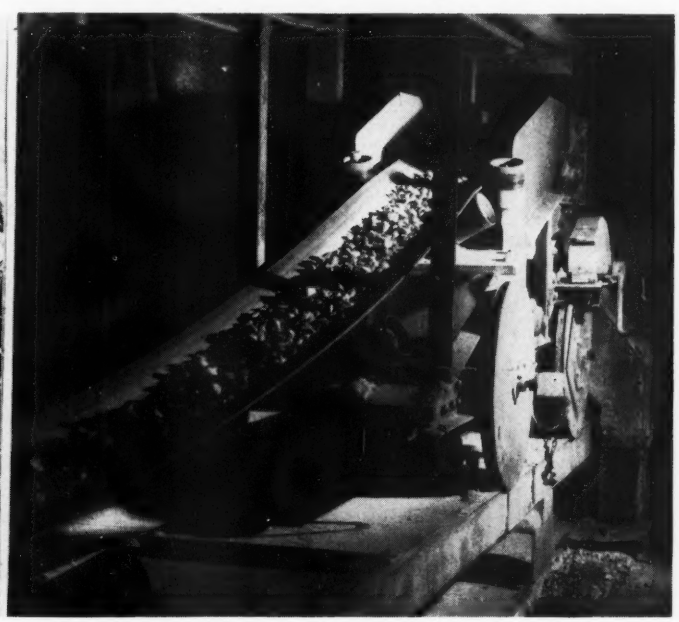
Finally, there is anhydrite. It is with this mineral as a raw material for acid production that this article is concerned.

From the technical point of view, the use of native sulfur for the manufacture of sulfuric acid has many advantages, because it requires a relatively inexpensive plant for the production of sulfur dioxide. Native sulfur is, however, a dollar commodity and it seems likely that, even if the exchange position improves, difficulties will be encountered in obtaining increased supplies from the United States because it is eager to conserve its resources of the element.

If we turn to pyrites, it will at

Photograph at left shows the anhydrite mine at Billingham, England, showing the personnel and material shafts. Anhydrite enters the process on a conveyor belt in photo at right in first step of British sulfuric acid process.





once be seen that although the exchange problems are less serious there can be no effective control over the price of this substance and wide fluctuations may therefore occur.

Anhydrite, on the other hand, is indigenous to Great Britain and although requiring a plant with a high initial capital cost the price is not likely to vary to a large extent. Moreover, the use of anhydrite for sulfuric acid production yields, at the same time, a high quality cement clinker so that it becomes economically attractive.

Built in 'Thirties

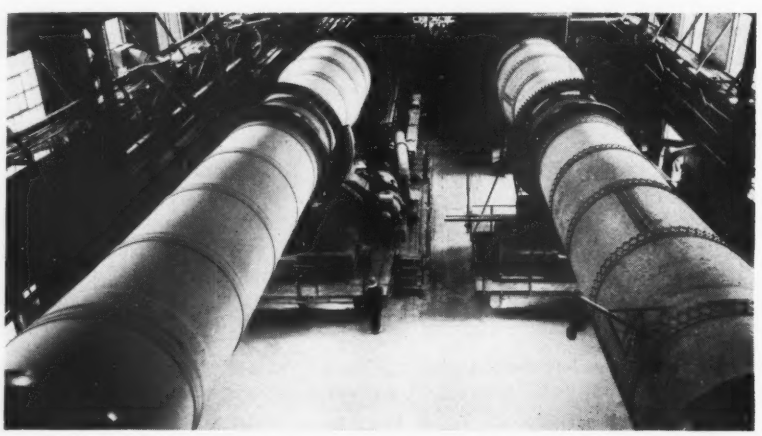
The plant at Billingham, England, to operate the anhydrite process was erected in the early 1930's and has since developed into a commercially successful unit. Its present production is in the order of 100,000 tons of 100 per cent sulfuric acid a year and it can be claimed to be unique in that, as far as is known, it is the only plant operating on a large scale at an economic rate.

Anhydrite is a relatively pure form of calcium sulfate without any water of crystallization and occurs in many parts of this country. At Billingham it is actually mined within the factory area where a deposit occurs some 600–700 feet beneath the surface. This deposit is used for the production both of sulfuric acid and ammonium sulfate and is mined at the rate of 2,400 tons a day. It has a purity of approximately 90 per cent. Another source is at Cumwhinton in Cumberland which supplies the M. O. S. Prudhoe plant, but deposits are also known in Sussex, Barrow-in-Furness, the Selby district of Yorkshire and elsewhere.

Heating Process

The process consists essentially in heating together anhydrite, sand, coke and ashes containing alumina. This reaction leads to the evolution of sulfur dioxide and the formation of a clinker suitable for the manufacture of cement. The sulfur dioxide is then converted into sulfuric acid in a contact plant which, in the main, follows established practice.

Pictured above are raw material storage bunkers and collecting conveyors for supplying mixed feed to the kilns. There are two sets of four bunkers, each arranged to discharge material to a common collector belt.



Powdered-fuel fired kilns in which the reaction takes place. Rotating kilns are similar in construction to those used in the manufacture of cement. Kilns are 224 feet long by 11 feet in diameter, fired by coal.

On delivery at the plant, all raw materials, except the anhydrite, which is dry, are first of all passed through rotary driers and thence to their respective storage bunkers. The driers are heated by coke oven gas obtained from ovens situated in another part of the factory area.

Sets of Bunkers

There are two sets of four bunkers, each set being so arranged as to discharge material to a common collector belt. The rate of discharge is controlled, so that the raw materials are fed on to the belt in the correct proportions to yield a satisfactory cement clinker conforming with the appropriate British Standard.

Collector Belts

The collector belts feed two four-compartment ball mills and the mixed feed is here ground to the required size and then elevated to storage bunkers to eliminate the possibility of a cessation of supplies while the kilns are functioning.

The material at this stage is known as "raw meal," and from

the storage bunkers it is fed into two rotating kilns similar in construction to those normally used in the manufacture of cement. The kilns are 224 feet long by 11 feet in diameter. They are fired by pulverized coal which is pre-dried, ground, and blown into the hot end of the kilns with the requisite primary and secondary air.

'Raw Meal'

During the passage of the "raw meal" through the kilns, the calcium sulfate evolves sulfur dioxide, leaving lime to combine with the alumina and silica in the other raw materials to give cement clinker. The gases from the kiln, containing about 9 per cent of sulfur dioxide, pass through a cyclone on leaving the kiln to collect the dust which is recycled by means of a shaker conveyor.

The final temperature of the solid material in the kilns is approximately 1,400° C., which is somewhat higher than that used in ordinary cement practice. Very careful control of this temperature and the rate of passage of the "raw meal" through the kiln and of the proportions of the raw materials is essential for satisfactory operation.

The clinker passes through recuperators before discharge to recover some of the heat, and is subsequently transported by means of an aerial ropeway to the cement plant.

Before the kiln gases are dispatched to the convertors they are passed through an elaborate purification system. As the gases emerge from the kiln, they enter a cyclone to remove dust, which is then, as already described, recycled to the kiln.

Partial Cooling

They are then partly cooled and subjected to a water wash to remove the remainder of the dust. Because some water remains after washing, the gases are then passed through an electro-precipitating unit to remove this mist.

This unit consists of five parallel sets of two electrostatic precipitators in series; that is, the gases are subject to two passages to insure complete extraction of the moisture. The precipitators are of normal design, being brick-lined lead vessels operating at a voltage of 40,000.

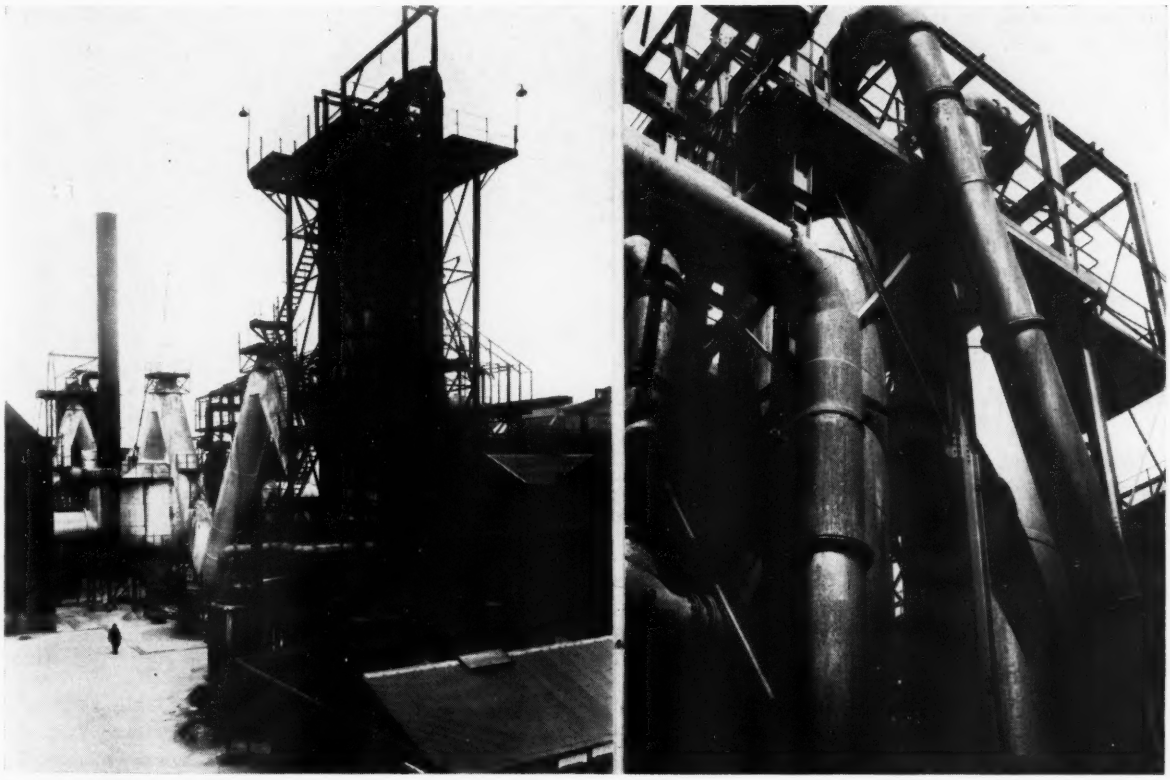
Final Stage

The final stage before conversion is complete drying of the gases. This is accomplished in two packed towers working in series in which counter-current washing, first of all with 92 per cent and secondly with 96 per cent sulfuric acid, is carried out.

The gases are circulated through the system by means of three centrifugal blowers, one of which acts as a standby. These create the necessary draft on the kilns and supply gases under slight pressure to the four sets of convertors.

From the blowers, the gases enter the convertor system through heat exchangers in counter flow to the outgoing gases. Two-stage conversion with platinum or vanadium catalysts is used, and the

Cyclone and wash tower for the kiln gases are pictured at left. Towers in right hand photograph are for sulfur trioxide absorption. Because of the shortage of elemental sulfur, the unique process was devised as substitute.



sulfur trioxide formed is absorbed in the normal manner.

To maintain the exit gas from the plant well below the requirements of the British Factory Act, it is washed with ammonia in counter current, giving a mixture of ammonium sulfite and bi-sulfite.

This liquor then is treated with acid to release the sulfur dioxide, which is returned to the plant.

Sulfate of Ammonia

The sulfate of ammonia solution formed during this operation is dispatched to the ammonium sulfate plant for recrystallization. As a result of this thorough treatment of the exit gases, the acid concentration is approximately 1.3 grains of SO_3 per cubic foot, which is well below the permitted level.

All cooling and wash waters from the acid plant are passed through a neutralizing pit before discharge.

Here they are treated with a correct portion of chalk and led through a series of serpentine troughs to allow time for complete neutralization to take place. The final effluent is checked continuously by a *p*H recorder.

The consumption of anhydrite is approximately 1.64 tons for each ton of acid produced, and yields, simultaneously, one ton of cement clinker.

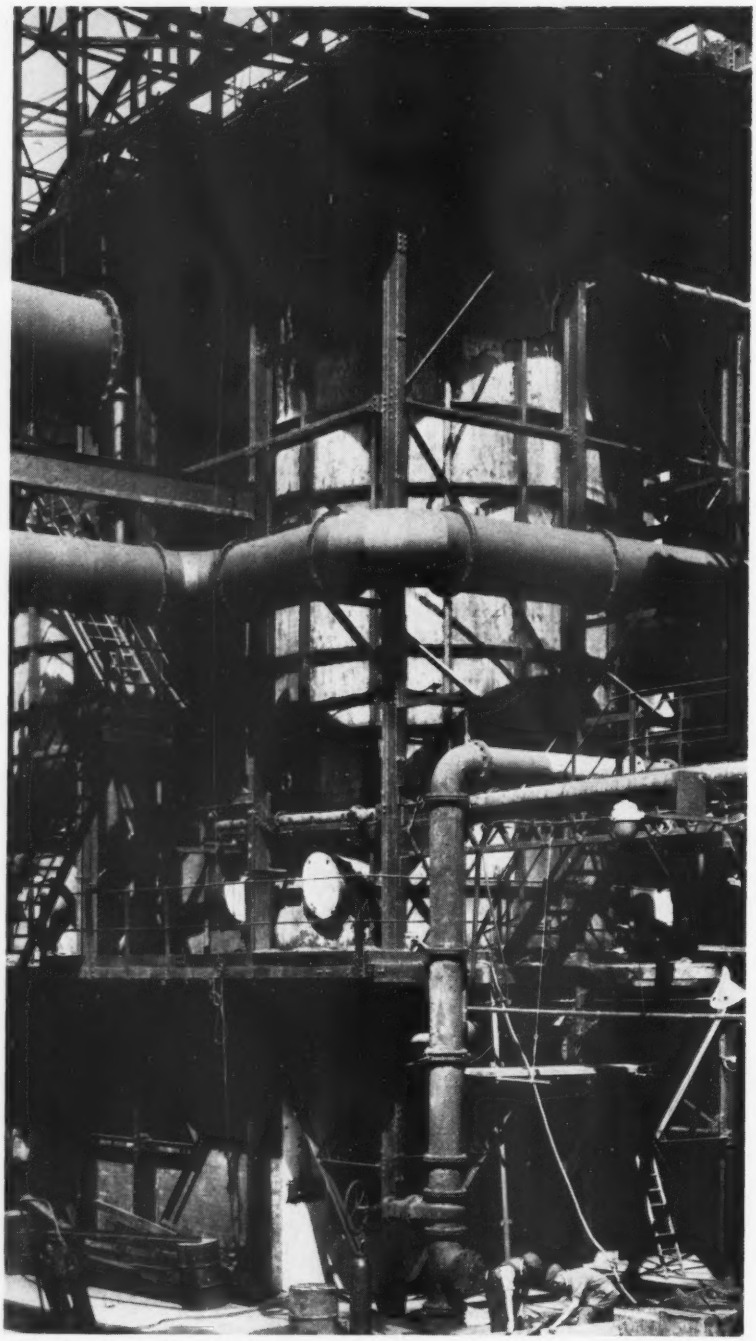
The fuel consumption is 0.266 ton of coal to a ton of acid.

In the kilns, the reaction between the anhydrite and the other raw materials goes practically to completion; in other words, all the sulfur in the anhydrite is evolved as sulfur dioxide.

Small Losses

However, not quite all of the sulfur dioxide appears as sulfuric acid. There are small losses in the washing of the gas and some sulfur passes out of the system as ammonium sulfate from the treatment of the gaseous effluent.

The overall conversion to sulfuric acid is 89 per cent, a figure which could be improved by the installation of a more up-to-date convertor system.



Final stage before conversion is complete drying of the gases. This is accomplished in two packed towers working in series in which counter-current washing with 92 and 96 per cent sulfuric acid is carried out.

Summary

The British shortage of elemental sulfur led to the use of anhydrite as raw material for the production of sulfuric acid.

Similar processes have been considered in other countries, but current shortages of materials needed for plant construction have largely curtailed attempts at adapting the method, which consists in heating anhydrite, sand, coke and ashes containing alumina together.

Sulfur dioxide is evolved and converted into sulfuric acid in a contact plant.

A clinker also is formed in the process. It is suitable for the formation of cement. ◆

Pros and Cons at

West Coast Delaney Hearings

Speakers disagree on effect pesticides have on humans

Several important areas of agreement and some vital diversities of opinion were revealed at the recent West Coast Delaney committee hearings.

When the Select Committee to Investigate the Use of Chemicals in Foods and Cosmetics held hearings in Washington and California some key statements were made which affect the future of agriculture and the work of manufacturers of farm chemicals.

A careful study of the prepared statements of 15 persons and organizations who gave testimony at the hearings reveals the following general points:

1. Almost without exception, those testifying lauded the work of farm chemicals in providing record increases in the production of crops for an expanding economy, in the face of land shortages, plant diseases and the ravages of insects. A complete breakdown of our economy was forecast by several speakers if the use of modern pesticides were stopped.

2. There are sharply conflicting views on the effects of the chemicals on humans. Many scientists claimed tests have shown that the chemicals, when used as recommended under present regulations, have no harmful effect on humans.

But two scientists produced data which they declared showed the harmful effects of the chemicals on humans.

3. All agreed that the dissemination of information about the chemicals is vital to their safe use. Educational programs, reports of surveys and tests and other information about the application and precautions to be taken with the chemicals are necessary to the well being of those who use the chemicals and those who eat food treated with them was the consensus of those speaking before the committee.

Amount of Testing

4. Conflict was noted again, however, as to the amount of testing that was necessary before a new chemical could be used by farmers and as to the nature and extent of regulations which should govern that use. Several speakers asserted that present regulations are sufficient for the safe use of chemicals; some asked for minor changes in the method of regulating the use of chemicals; while several claimed present laws are inadequate and that anyone using a pesticide on or near food should be required to prove that his methods do not make the foods poisonous for human consumption.

In the following excerpts from statements made before the committee, the key points of the speakers in these four general areas are given to show a composite of their attitude toward the use of farm chemicals and their suggestions for future use of the substances on food crops.

Here's what speakers had to say about the importance of chemicals in combating pests and aiding in increased production of food:

H. M. Armitage, *chief of the Bureau of Entomology, State Department of Agriculture, Sacramento, Cal.*—

In view of my experience as outlined and my present responsibilities as Chief of the Bureau of Entomology, I fully appreciate the opportunity of appearing before your select committee for the purpose of commenting on (a) the necessity of use of pesticides as used in the protection of agricultural crops in California, and (b) the need for and nature of adequate provisions that obviously should be provided to assure their safe use with respect to man and livestock. Both of these matters are of particularly vital concern to the agricultural industry of California and no less so to that of the nation. . . .

Insects Thrive

Insects are just as responsive to a favorable climate as is man. They have the added advantage of short life cycles with high reproductive capacity which insures survival under the most adverse conditions and permits them to increase to

epidemic numbers under the favorable host conditions provided by man.

A prominent entomologist is authority for the comment that were it not for the ingenuity of man in providing control, this would be an age of insects. This holds true in agriculture. At that, out of the several hundred thousand insect species recorded, relatively few ever attain the status of major insect pests. However, those few, unless under control, can be responsible for tremendous losses to growers. . . .

W. M. Hoskins, *professor of entomology, Division of Entomology, Agricultural Experiment Station, College of Agriculture, University of California*—

A brief recapitulation of the points in this report may be made as follows: Under the present regulations governing agricultural chemicals new materials are introduced gradually so that the reaction of humans to contaminated foodstuffs may be watched before these make up more than a small fraction of the total food. As a matter of fact, most of our food is completely out of contact with any pesticide. This gradual introduction of a chemical into the human foodstream provides much more pertinent data than could be obtained from any amount of animal testing for nearly all toxicologists are in agreement that animal feeding is only a prelude to actual use in human diets.

This permits the most prompt evaluation of their important role in providing food that is wholesome from all points of evaluation, including the absence of harmful incidental constituents.

New pesticides cost a great amount of time and money to develop. They have been brought out almost exclusively by private industry which is in harmony with our national tradition of individual initiative. Lastly, new pesticides are needed to enable agriculture to meet the demand for more food and fibre and especially to overcome the problem presented by development of pests resistant to chemicals now in use.

Fred L. Overly, *horticulturist, State College of Washington, Tree Fruit Experiment Station, Wenatchee, Wash.*—

It should be emphasized that the economy of the fruit industry of the Northwest, and of the whole nation, is directly related to the use of chemicals in the forms of pesticides and fungicides. A sudden banning of the use of chemicals, or a very limited usage of chemicals in fruit production, would seriously cripple this phase of our agricultural production.

For 50 years or more chemicals have been used by the farmers of the nation for the control of harmful insects and diseases that are continually at work on all forms of plant life. Prohibitive regulations on the use of the chemicals, that have been discovered in the past, for the control of the insects and diseases would result in the wiping out in a short time, of the trees fruit industry, the vegetable industry and the small berry industry to mention only a few. The use of chemicals is essential if good high quality insect and disease free produce is to be made available to the consumer.

Widest divergence of opinion at the hearings centered around the effect chemicals have on the persons applying them and on persons consuming food which has been treated with chemicals.

Dr. B. Rodney Bertramson, *chairman of the Department of Agronomy, State College of Washington,* pointed out the phenomenal yield increases of high quality food made possible by modern chemicals.

He endorsed the recorded testimony presented by Dr. William A. Albrecht, Dr. Firman E. Bear and others and said it "fully confirms the importance of fertilizer and refutes with data from well planned experiments the claim of organic farming enthusiasts based upon broad observations and unreplicated experiments of men not trained in scientific methods of research. Similar testimony to that of the scientists named above could be supplied by state experiment station and U.S.D.A. scientists all over the United States. . . .

Chemicals used for weed control decompose rapidly in the soil and therefore will not accumulate after years of repeated application and will not become harmful to desirable crops or animals. Nor is there any health hazard resulting from the consumption of produce treated with herbicides at dosages recommended for weed control. It is true some chemicals applied to the soil for weed control cause it to be unproductive for a few months or a few years, but the effect is relatively short-lasting and there are no harmful residues from the decomposition of the chemical herbicide.

Similarly, the alleged health dangers of pesticides were decried by **R. H. Robinson,** *chemist at the Oregon Experiment station, Oregon State College:*

If spray residues are present on food crops throughout the country in amounts found in Oregon no further costly legislation is necessary to protect the public health. Residues found on food products, in the form that these foods are now eaten by the public, are far below amounts that could possibly cause a health hazard. Actual analyses of the food products obtained from the retail market will confirm this opinion. Analyses from other sources should not be considered.

The use of pest control chemicals on fruits in California was described by **J. Russell Esty,** of the *National Canners Association, Western Branch Laboratories.* According to Esty—

During the 1949, 1950 and 1951 apricot seasons industry laboratories in California compiled information on the orchard practices of their growers with respect to the use of insecticides of a kind and/or at a time during the crop growth which might be of significance from a residue hazard standpoint. The surveys showed that for the most part growers in California were following closely the recommendations of the California agricultural advisory agencies as to the selection of pesticides and their use.

An analysis of samples of fresh fruit taken from cannery deliveries and representing many orchards provided substantial evidence that the insecticide treatments and schedules recommended by the State agencies do not leave residues on the fresh fruit which could be regarded as hazardous in light of present knowledge of their chronic toxicities.

Similar surveys and analyses on California prunes indicate good compliance by growers with the

spray schedules recommended by the California agricultural advisory agencies in that residues in the final product could not be regarded as hazardous.

Working with Dr. Michelbacher and his associates in the Department of Entomology of the University of California since 1946, we have made residue studies on several of the newer organic insecticides applied to tomatoes.

Studies in 1946 and 1947 indicated that DDT and DDD showed considerable promise in controling the important insects attacking tomatoes and that these new materials were much more effective than calcium arsenate. A 10 per cent toxaphene dust was found to be about as effective as calcium arsenate for insect control on tomatoes. They also indicated that when used at the rates recommended, DDT and DDD would not present a residue hazard.

Contrary opinion, setting forth the dangers of pesticides and their relation to illnesses, was presented by **Bernard Krohn, M.D.,** of *Monrovia, Cal.* An excerpt of Dr. Krohn's statement follows:

In 1945 three English physicians gave themselves doses of DDT to see what it would do. They became tired, weak, and irritable; their limbs ached, and they felt mentally dull. Dr. V. D. Wigglesworth, one of the three, was completely disabled for ten weeks. But they lived to report their experiences in the *British Medical Journal.* Since then we have been learning how dangerous these pesticides are.

In the past year and a half I have seen the following evidence that chlorinated hydrocarbon pesticides can cause chronic illness:

1. I examined four patients who complained of exhaustion, irritability and mental dullness which appeared after repeated exposures to these pesticides and which lasted more than six months. We examined their blood and found two signs that something had damaged their livers: the amount of cholesterol in their blood was abnormally high, and so was their icteric index. With the assistance of Millicent Cole, R.N., I removed three grams of fat from the abdomen of each patient and had it analyzed by the U. S. Food and Drug Administration. They reported that each sample contained over 5 parts per million of DDT equivalent; this is a toxic amount, according to their chief pharmacologist, Dr. Arnold Lehman. The exact concentrations were 15 ppm, 6.5 ppm, 19 ppm, and 33 ppm. Dr. Lehman also reported that this concentration causes liver damage in rats.

Feeding DDT to animals causes nervous disorders and liver damage. Four humans were exposed several times to these pesticides; they stored the pesticides in their tissues; they developed the same disease as the poisoned animals; and the disease persisted for more than six months.

Nervous Disorders

2. With the assistance of Lydia Howard, R.N., I examined more than 100 other patients who were exposed to chlorinated hydrocarbon pesticides. These patients had the nervous disorders and liver damage described above. I advised them how to avoid further exposure and treated them for the damage they had suffered. They recovered slowly and still had some symptoms at the end of three months or more.

3. Looking for evidence of pesticide poisoning, I reviewed the pathologist's report on 20 autopsies chosen at random at the Huntington Memorial Hospital, a large general hospital in Pasadena. The U. S. Food and Drug Administration had analyzed fat specimens from these cadavers at the request of Dr. Francis M. Pottenger, Jr. They found chlorinated hydrocarbon pesticides in 19 of the 20 specimens; they found over five parts per million, the toxic level, in four of the 20 specimens. The pathologist reported liver damage in 16 of the 20 cadavers. These patients died from such diseases as cancer, heart disease, and pneumonia; some of these diseases might have contributed to the liver damage.

Summary: Almost all of a group of cadavers chosen at random had DDT-pesticides in their tissues; some had high concentrations. Eighty per cent of the cadavers had liver damage, which commonly results from DDT poisoning.

4. I examined 14 people who live in the Bardsdale area, near Fillmore, Cal. This is an agricultural area where they use chlorinated hydrocarbon pesticides. Eight of the 14 had signs and symptoms of pesticide poisoning. The U. S. Food and Drug Administration analyzed fat specimens from two of these eight and found they contained 19 ppm and 33 ppm of chlorinated hydrocarbon pesticides respectively. These are toxic levels. All of the eight had suffered from their symptoms for many months. A fat specimen from one of the group that had no signs or symptoms of pesticide poisoning contained no pesticide.

Summary: More than half of the group of people living in an agricultural area where they use DDT pesticides had signs and symptoms of pesticide poisoning. Tissue analyses in selected cases confirmed the diagnoses.

Chlorinated hydrocarbon pesticides can cause chronic poisoning because they are potent, stable, and cumulative. You can take several small doses, each of which might not hurt you by itself; but they accumulate in the body, chiefly in the fat, and add up to a big toxic dose that can cause chronic illness.

Pesticide Poisoning

Many manufacturers and users of pesticides are trying sincerely to protect the public. But from my own observations I know that many people are suffering from chronic pesticide poisoning.

Further testimony about the effects of chemicals on humans was presented by **Francis M. Pottenger, M.D.,** of *Monrovia, Cal.*

Dr. Pottenger said his interest in the problem of pesticides was spurred when he noticed that quite a percentage of veterans who previously had been his patients, showed a great lassitude when they returned to civilian life. He said some showed a mild icterus, or yellow color to the white of the eyes and skin.

He said much of this had been masked while the men were in the service by atabrine as an antidote for malaria. Many were nervous and exhausted and showed a prolonged period of psychic disturbance, complaining of chronic cough

and weakness. Some showed disturbances in the skin.

Dr. Pottenger continued his statement as follows:

I had no proof of the exact cause of this illness, but it was evidenced that the cause of it was hepatotoxic, or that liver damage had occurred in most of these boys who were so exhausted.

Shortly after the close of the war, DDT bombs became very prominent and DDT began to be used generally by the public. I noted that some of my patients showed similar phenomena to those shown by the ex-service men.

First Proof

The first proof, or the first concrete evidence that I had of DDT poisoning occurred in a public health nurse who was given DDT bombs to spray the premises of her patients. She was called in to see a Mexican family who had a small enclosed room and inasmuch as it was assumed to be contaminated with vermin, she followed the instructions and thoroughly sprayed the room. Immediately, she suffered a rapid heart beat, pain in the region of the heart, great fatigue and extreme apprehension. It was necessary for her to rest a considerable length of time before she was able to drive home. However, her symptoms of precordial pain and rapid heart remained for several days. This was followed approximately two weeks later by a so-called attack of virus pneumonia.

Following this, I saw more and more patients who, I felt, had had ill effects from the use of pesticides and we began to find a relationship between certain gastrointestinal episodes that were frequently followed in approximately ten days to two weeks by respiratory episodes, sometimes of the type that we have been calling virus bronchitis.

In some of the instances, certain fruits and vegetables were definitely suspected. Samples of these were obtained and sent to the Bureau of Chemistry of the State of California, with the report received that they did contain pesticides but that they were within the legal limit. The gross offenders among these fruits were apples and pears.

Occasionally a patient who has ingested pesticides will suffer from an acute gastro-intestinal episode. This is followed by bronzing about the eyes, icterus of the sclerae and an increase in the icteric index. Frequently, there is a secondary episode in ten days to two weeks. At this time the blood cholesterol begins to rise and may continue to rise for several weeks. These secondary effects are frequently followed by prolonged exhaustion.

After becoming acquainted with the work of Dr. Lehman and others in the field, I made arrangements with the U. S. Food and Drug Administration, Washington, D. C., to run some samples of fat of some of my patients suspected of pesticide poisoning. Our findings varied from no detectable amount to as high as 33 ppm. In running fats from patients who came to autopsy, specimens being provided by Dr. A. G. Foord, pathologist of the Huntington Memorial Hospital in Pasadena, a similar range of concentration was found in the fat of individuals who died from causes unrelated to pesticide poisoning. However, a large percentage of these, reported on by my associate, Dr. Bernard Krohn in his prepared statement, showed evidence of liver damage.

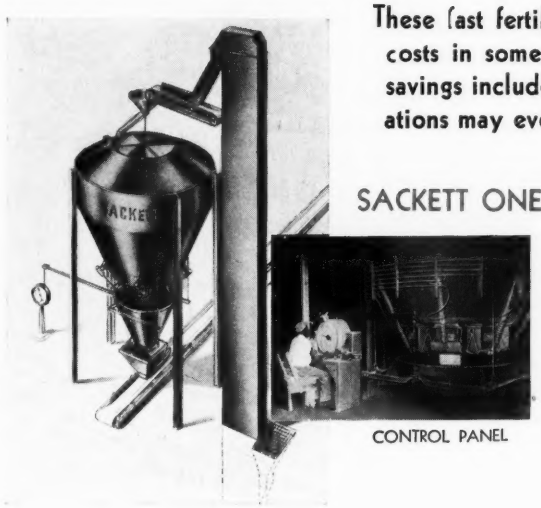
Was DDT Responsible?

It is true that severe illness causes liver damage, but the question arises, did the presence of chlorinated hydrocarbon pesticides, determined as DDT, in their fat contribute to the death of these people?

There is another point which we have found in our work: various individuals vary greatly in their susceptibility to pesticide poisoning. We are all familiar with the fact that there is the man who can consume his fifth of whiskey a day, year in and year out, without evidence of ill effect, and yet there is the other man who suffers from taking a small amount as one cocktail.

In the next issue of FARM CHEMICALS, *a summary of some of the comments about existing legislation and regulations concerning the use of chemicals on crops will be presented, along with suggestions for future testing and regulation of the chemicals.* ◆

SACKETT FERTILIZER PROCESSING SYSTEMS PAY OFF



CONTROL PANEL

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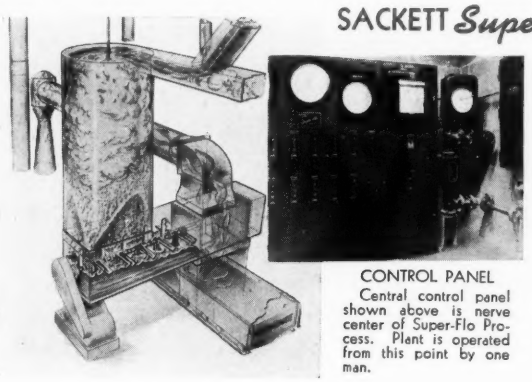

CONTROL PANEL
Central control panel shown above is nerve center of Super-Flo Process. Plant is operated from this point by one man.

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These Sackett patented processes are built in three sizes, 25 tons to 75 tons per hour.

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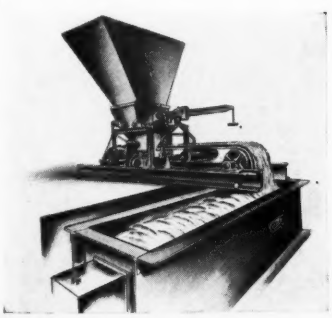

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Safety Committee

can reduce rate of accidents in plants and create interest in industrial program

ACCIDENTS in the fertilizer and pesticide industry are on the increase according to recent safety statistics. Some of the accidents can be explained with the fact that many new employees have been added to the payrolls and these people are not as safety conscious as they should be. Another factor contributing to this increase in accidents is the fact that old employees have grown lax in observing the safety rules established in the plant.

Accident Rate

Individual pesticide and fertilizer plant owners and managers can check their own accident rate with the national average. An average of eight days per worker per year is lost due to accidents. To check plant performance against this national average, take the total number of lost days due to accidents in the plant and divide this by the number of employees.

For instance, if during the past year there were 360 days lost by employees in the plant because of accidents, and there are 40 employes on the payroll the result will be nine days lost per employe.

This computation will give management the cost per employe on a financial basis, but it does not take into consideration other cost factors. Nor does it consider the physical pain these employes suffered in these accidents.

Other Costs

From management's standpoint there are other costs—intangible costs—that are hard to compute. It takes time and costs money to break in a new man to take over after there has been an accident.

If another worker is transferred to take over the work of the accident victim, production will drop all over the plant. And, if the accident rate for the fertilizer plant continues to maintain a high level the insurance rates will continue to climb.

When top management in a plant is convinced that something should be done to decrease the accident rate there is always the problem of what to do. Some plants have hired safety directors, or have given the safety director's assignment to someone in the plant.

This puts one individual in charge of all safety measures and fixes responsibility for a continued high rate of accidents in the fertilizer plant.

For many plants this is expensive and may not prove satisfactory. It requires an individual who understands all of the work of the plant, knows how to inspire workers to observe safe procedures, and who will take a definite interest in this phase of the safety director's job.

A more practical solution to this accident problem for the average fertilizer or pesticide plant is the appointment of a safety committee. This group of supervisors and workers in the plant is established for two definite purposes:

1. To provide safety education;

2. To fix responsibility for carrying out the safety program.

In selecting the workers and supervisors for the safety committee there are certain things to be kept in mind. Most plants which have used the plant safety committee to help reduce their accident rate agree that the committee should be made up of persons from the management level and persons from the employe classification.

This avoids the possibility of safety being a top level recommendation and since fellow workers

are on the plant committee the rank-and-file of the workers will go along with what the committee recommends.

Another consideration in selecting a plant safety committee is to be sure that there is representation from all sections of the plant. This should include all types of workers and all physical areas of the plant to be most successful.

This will prove valuable in developing solutions for safety programs that will meet the requirements of the various departments. Then, too, it will cover all types of accidents and make the safety program more complete for the plant.

Fertilizer and pesticide plant operators who have safety committees recommend that not more than eight or ten members make up the safety committee. In larger plants the group is usually placed on a rotating basis and in smaller firms the number of the committee members is reduced to serve the needs of the individual plant.

When the members of the safety committee are changed frequently the effectiveness of the safety program is increased. In some plants with a safety committee, half of the members are replaced every six months.

Thus, a worker or a supervisor will serve for a period of a year, but every six months half of the group is new and will bring fresh viewpoints to the plant safety committee meetings that can be tempered with the wisdom of the older members of the group.

Five Responsibilities

For best results, most chemical plant operators agree that the plant safety committee should have five definite responsibilities in carrying out its work:

1. Set standards for guarding the equipment.

2. Formulate safety rules and make necessary changes in existing rules.

3. Investigate all accidents in the plant.

4. Review safety suggestions presented by their group and by other workers in the plant.

5. Make recommendations for changes in process or for the purchase of safer equipment or attachments.

In setting standards for the safeguarding of the equipment and the workers in the plant, the safety committee will be guided by the present facilities. These standards may be ideal, but if accidents continue to happen in these areas management might be money ahead to adopt these safety standards immediately to provide safer working conditions.

Safer rules made by the safety committee usually will be more closely observed than if management passes down a list of safety directives.

These rules will be made by a group of workers and naturally will take their interest into consideration. The other workers in the plant will realize this fact and will be more willing to follow the new safety regulations.

Accident Investigation

Accident investigation should be a continuing process in any fertilizer plant. This investigation should answer the important questions of how, who, when, where and why for each accident in the plant. When the committee develops the ability to investigate along these lines it will be able to determine what should be done to prevent a recurrence of this same type of accident.

Workers in the plant will have suggestions for the improvement of the safety facilities of the plant. Of course, some of these suggestions will not be practical, but with a safety committee to pass on these suggestions a great deal of antagonism that might develop when an idea is not adopted will be avoided.

Because this committee is close to the problem in its work and is working with safety the plant committee will be able to determine quickly if the suggestions are practical.

In making recommendations, the safety committee may cover changes in the safety rules, purchase of new equipment or safety devices for operating equipment, frequent inspection of certain accident areas, and a change in the employee requirements (such as age or physical condition) for certain phases of the fertilizer plant work. These recommendations should be submitted to top management at any time there is something that requires action.

Safety committees usually meet once a week during the start of the program. After the groundwork is laid for the safety program in the plant the meetings are held about once a month.

On Company Time

These meetings are held on company time, or if it is necessary for the committee to meet after hours, additional compensation is made to the members of the committee for their time.

When a farm chemicals plant safety committee is functioning in the plant the accident rate will decline. Through this group of supervisors and workers a continuing interest is developed for the safety program and everyone in the plant will do more to cooperate with the committee. ◆

Solvay to Build Big New Plant

Construction of a mercury cell chlorine-caustic soda plant on a 400 acre site near Moundsville, W. Va., is planned by Solvay Process Division, Allied Chemical & Dye Corporation.

The plant will cost approximately $15 million and will provide employment for 125 persons.

The company has been sinking exploratory wells for several months to determine the extent of a salt deposit located under the property.

These will be converted to commercial wells and development of new brine wells will commence promptly. It is estimated that approximately 18 months to two years will be required to complete construction of the plant.

Engineering work in connection with design of the plant will be carried on by Solvay's own forces. The plant will be served by the B. & O. Railroad. Electric power for the Moundsville plant will be purchased from American Gas and Electric Service Corporation.

Fleischmann Stresses Need for Maintenance

Manley Fleischmann, Defense Production Administrator, told industry representatives metal supplies for maintenance and repair of machinery and equipment for the second quarter of 1952 will be approximately 2,000,000 tons of steel, 100,000,000 pounds of copper products and 4,000,000 pounds of aluminum.

The forecast was made Jan. 16 at the third national plant maintenance conference in Convention Hall, Philadelphia.

It is important for defense that machinery and equipment be kept in good repair, Fleischmann said.

"Our conservation practices must extend to the machines with which the products are made as well as the products," he declared.

Fleischmann headed a group of 56 speakers in the most extensive discussion of plant maintenance problems ever undertaken. The conference was held Jan. 14–17.

It was conducted in conjunction with the plant maintenance show, attended by more than 14,000 persons. Exhibits from more than 250 companies were on display in the building during the four-day show.

The conference was sponsored by the American Society of Mechanical Engineers and the Society for Advancement of Management.

FERTILIZER MATERIALS MARKET

New York

January 22, 1952

Sulfate of Ammonia

A better movement was reported of this material against contracts with no price changes reported in the East. Prices are still $40.00 to $45.00, f.o.b. shipping points in bulk. Some export inquiry was noted recently.

Nitrate of Soda

No price changes were reported and stocks available are ample at the moment but later on a shortage is looked for.

Ammonium Nitrate

Recently several producers raised their prices slightly, about $3.00 per ton, and are sold out for the balance of the fertilizer season.

Nitrogenous Tankage

Most domestic producers are sold out and a limited quantity of imported material is offered at about $6.25 per unit of ammonia ($7.59 per unit N), c.i.f. U. S. ports.

Castor Pomace

Buyers are still trying to book this material for both prompt and nearby shipment but offerings are very limited due to the low production. Price remains the same at $37.25 per ton, f.o.b. Eastern shipping points in bags.

Organics

Organic fertilizer materials were very firm in price, due to scarcity of offerings. It was most difficult to locate any offerings of linseed meal and practically all producers were out of the market because of the present low production. Soybean meal was sought by the buyers at the ceiling price of $74.00 per ton, f.o.b. Decatur, Ill. in bulk but only distant positions were available in limited quantities. Cottonseed meal was difficult to locate for nearby shipments. Demand was better from the feed trade for tankage with last sales made at $8.25 per unit of ammonia ($10.02 per unit N), f.o.b. Eastern shipping points, and blood last sold at $8.50 ($10.33 per unit N), f.o.b. New York.

Fish Meal

Demand has picked up considerably particularly from the feed trade and offerings are difficult to locate for nearby shipment. Some imported material was offered at around $2.26 per unit of protein, f.o.b., Atlantic ports.

Bone Meal

Fertilizer bone meal is difficult to locate. Feeding grade is selling at from $80.00 to $90.00 per ton and is mostly imported material. Very little raw bone meal is available at prices around $80.00 per ton.

Hoof Meal

Last sales reported at $7.25 per unit of ammonia ($8.82 per unit N) for both South American and domestic material. Demand continues good.

Superphosphate

This material is tightening up in various spots but the real pinch is looked for in about 60 days. Triple superphosphate is still in heavy demand.

Potash

Considerable amounts of foreign muriate of potash continue to arrive at various Atlantic and Gulf ports and importers are keeping prices in line with the domestic market at around 65 cents per unit at the port. Domestic producers are sold out till May 31st.

Low Grade Ammoniates

Demand for this class of material was rather limited at present, due to the shortage of superphosphate.

Charleston

January 21, 1952

Prime problem for smaller fertilizer manufacturers continues to be the amount of superphosphate they will secure. Nitrogen is beginning to tighten somewhat in supply but is expected to be practically adequate in supply. Potash supplies appear to be sufficient to meet the demand.

Organics.—Fair activity has been shown recently in domestic nitrogenous tankage for shipment the first few months of 1952. Prices of domestic nitrogenous tankage range from $4.25 to $4.90 per unit of ammonia ($5.16 to $5.95 per unit N), bulk, f.o.b. production point. Imported nitrogenous is offered in limited quantity at $6.15 to $6.25 per unit of ammonia ($7.47 to $7.59 per unit N), bagged, c.i.f. Atlantic port. Hoof and horn meal from abroad is around $7.25 to $7.50 per unit of ammonia ($8.82 to $9.12 per unit N), in bags, c.i.f.

Castor Pomace.—Production of domestic castor pomace continues very limited and the market is firm at $37.25 per ton in burlap bags, f.o.b. Northeastern production points. $2.00 per ton allowance is made if shipment is in paper bags. Analysis is guaranteed minimum 6.75 per cent ammonia. Imported castor pomace ranges in price from $44.50 to $47.50 in bags, ex-vessel Atlantic ports.

Dried Blood.—Unground dried blood at Chicago is rated at $8.50 per unit of ammonia ($10.33 per unit N), bulk, f.o.b. Chicago area. New York market is around $8.50, with demand exceeding supply.

Potash.—After somewhat reduced shipments during the holidays, movement of muriate of potash is approximately normal from domestic sources. No spot period is expected this season due to heavily sold production during May.

Ground Cotton Bur Ash.—This form of potash, primarily in the form of carbonate of potash, is available in fair quantity for prompt and future shipment. Best productions test approximately 40 per cent K_2O and delivers at prices comparing favorably with sulphate of potash.

Phosphate Rock.—Supply position appears comfortable with movement steady to domestic consumers. No change in prices has been noted.

Superphosphate.—Practically all producers are sold up through June. Prices remain firm and at ceiling levels. Market is described as extremely tight.

Sulphate of Ammonia.—Production continues to be shipped as produced, maintaining the market in tight position. No changes in prices have been announced and demand exceeds supply.

Ammonium Nitrate. — Market continues extremely tight with demand far in excess of supply. Prices continue at $69.50, f.o.b. Canadian shipping point and $61.00 to $64.00, f.o.b. works at domestic producing points.

Nitrate of Soda.—Market on imported nitrate of soda continues comfortable with supply and demand in balance. Demand is increasing with seasonal requirements.

Philadelphia

January 23, 1952

The supply situation in raw materials finds superphosphate exceedingly tight, and nominally tight in the solid forms of nitrogen. It is expected that the superphosphate position will be quite critical before the end of the season. Potash seems to be in ample supply. Bone meal is still in strong demand, as is tankage at the moment.

Sulphate of Ammonia.—While nominally tight, the production at this time compares favorably with last fertilizer year, and while at present the demand is not extra keen, the scarcity is expected to become quite pronounced as the season progresses.

Nitrate of Soda.—Seasonal demand continues and market is firm. Stocks are sufficient to meet requirements.

Blood, Tankage, Bone.—Blood is rather quiet at $8.00 per unit of ammonia ($9.72 per unit N), here in the East, and $8.50 ($10.33 per unit N) Chicago area. Tankage at present is in quite fair demand. being quoted at $8.50 here and $9.00 per unit of ammonia ($10.94 per unit N) in Chicago. Bone meal remains strong at $72.50 per ton for raw grade, and $80.00 and over for steamed.

Castor Pomace.—There are no offerings of this material in the market at present.

Fish Scrap.—Menhaden meal is practically out of the market, while imported fish meal is offered at $2.26 per unit of protein which is ceiling.

Phosphate Rock. — Movement against contracts is improving and the supply position is reported comfortable. The sulphuric acid situation more or less regulates the rock tonnage that acidulators can call for on their contracts.

Superphosphate.—This is very scarce and the situation is due to become critical as the season advances. There seem to be no offerings in the market.

Potash. — Production is practically all sold to May 31, 1952, and shipments are now moving more nearly to schedule. Deliveries are being made out of production and it is reported that several cars of muriate have been shipped from a new plant just opened up.

Mexican Sulfur

Gen. Alfredo Breceda, vice president of the National Farmers Association in Mexico, and an expert on soil improvement, has estimated that Mexico's sulpfur deposits are sufficient for a production of 200,000 tons a year. He stated that sulfur domes already found in the country are "as big or bigger than anything in Texas or Louisiana."

In an unofficial conference with members of the American Farm Bureau Federation he said U. S. companies already have proved the deposits and are ready to start working them.

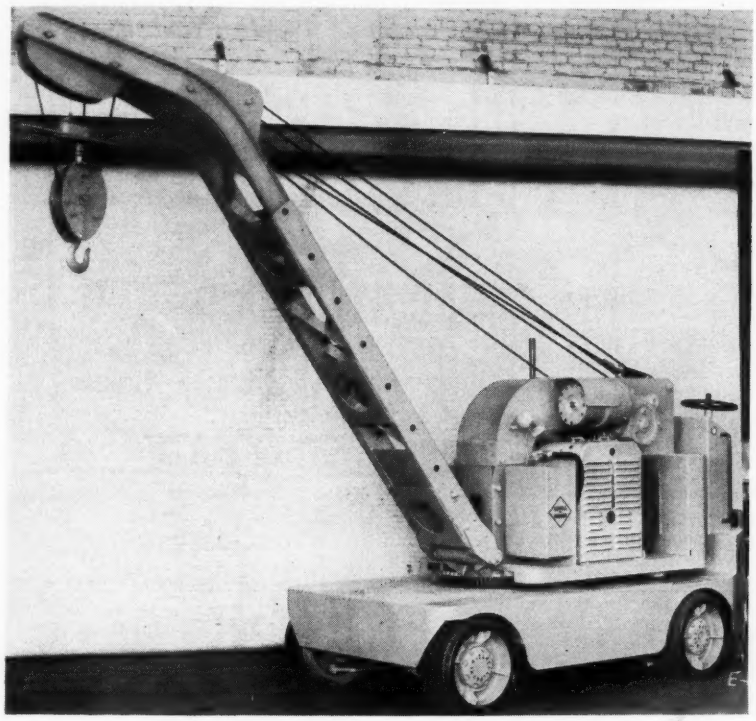
Mexico's current production of 5,000 tons a year from all refineries is used chiefly at home. When production is increased the nation expects to export considerable quantities of the product.

Breceda also said some small deposits of phosphate rock have been found in Mexico and a search is under way for more.

Industrial News

New Products *New Plants* *New Appointments*

1-1 Flexible Industrial Crane



Elwell-Parker electric-powered mobile crane

Materials handling problems in the farm chemicals industry probably call frequently for movement of equipment or material which does not lend itself to conventional handling methods using a fork truck or platform truck.

If that's the case, the Elwell-Parker Electrical company thinks it has the solution to the problem, through use of its flexible industrial crane.

The crane, electric powered, is mobile and recently was redesigned with a wider bed and higher operator control pedals for better forward visibility.

It has four-wheel steer, telescoping boom to provide boom lengths from 12 to 19 feet, silent efficient worm drive, heavy welded steel frame and three individual motors with solonoid - operated brakes for powering slew, hoist and boom.

Power is supplied to the crane by either an electric storage battery or a gas-electric unit. Conventional wheel steer is standard but electric power steer is recommended when heavy loads are to be handled.

To get additional technical information about the mobile crane, fill out a **Reader Service Card** with number **1-1.**

Glendon Pyrophyllite Opens Insecticide Plant

Glendon Pyrophyllite has opened a new plant for the manufacture of its insecticide grade Pyrophyllite, a diluent and carrier for insecticides.

The material is mined and processed at Glendon, N. C.

Pennsalt Joins With Sharples

Sharples Chemicals Corporation has been combined with the Pennsylvania Salt Manufacturing Company, through an exchange of common stock.

George B. Beitzel, Pennsalt president, said Sharples will continue operation as a separate unit of Pennsalt for the present, with an exchange of technical information and coordination of some policies to the benefit of both organizations.

"The combination of Sharples with our company," he added, "gives Pennsalt an established position in the synthetic organic chemical field—a field in which we have been increasing our activities and interest for several years."

He also pointed out that each company has established markets for some products of the other, such as one Sharples' product, a herbicide and defoliant, in agricultural chemicals, and Nonic, a surface active agent, in the detergent field.

Another advantage to the combination, he said, is that it assures Sharples a supply of some of its basic raw materials, chlorine, caustic soda and ammonia, which are produced at Pennsalt's Wyandotte plant, adjacent to the Sharples plant.

"Both companies have established good reputations in the chemical industry and among other industries and the consumers they serve," he said.

Philip T. Sharples was elected to the Board of Directors of Pennsalt.

Sharples is Chairman of the Board and former President of the Sharples Corporation and Sharples Chemicals, Inc. and is President of the Sharples Oil Co. He also is a Director of the Fidelity-Philadelphia Trust Co., the Lehigh Valley Railroad and Sharples Centrifuges, Ltd. of Great Britain.

DuPont Grants $510,000 to Support Research

The duPont Company has announced authorization of $510,000 provided by the company for 75 post-graduate fellowships to 47 universities, and grants-in-aid to 15 universities to "stock-pile" knowledge through the support of fundamental research.

The appropriation, for the 1952-53 academic year is higher than the $405,400 for the present year.

No Restrictions

Grants are made to the universities without restrictions. The universities decide the lines of research they will follow after receiving the grants. Funds must, however, be used for the advancement of fundamental research, work done for the advancement of basic scientific knowledge and not for specific commercial purposes.

The grants are guaranteed for two years. DuPont emphasizes that there shall be complete freedom in the communication and publication of the results of the research supported by the grants.

Institutions which will receive $15,000 grants each are California Institute of Technology, Cornell University, Harvard University, University of Illinois, Massachusetts Institute of Technology, University of Minnesota, The Ohio State University, Princeton University, University of Wisconsin and Yale University.

$10,000 Grants

Institutions which will receive grants of $10,000 each for the first time are University of California at Berkeley, University of California at Los Angeles, Columbia University, Northwestern University and University of Michigan.

The company also continued its support of the Wallace Hume Carothers Research Professorship in Chemistry at Harvard University with a contribution of $15,000 for the academic year. This professorship, which was established during the past year, enables a different staff professor every year to devote his full time to research.

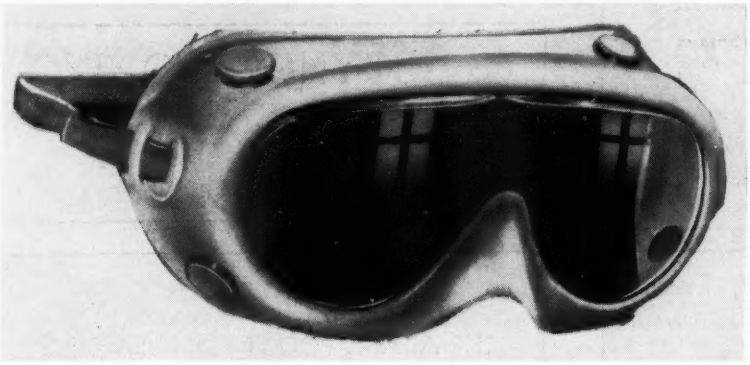
Also authorized was $20,000 for continuing the company's membership in the Institute for the Study of Metals, University of Chicago.

Granting of the post-graduate fellowships is a continuation of the company's plan, originated in 1918, to encourage students to undertake post-graduate work in chemistry. It has since been expanded to include other fields of science and engineering. It provides support for pre-doctoral training of students in institutions of higher learning.

It is expected that the program will help maintain the flow of technically trained men and women into teaching and research work at universities and into technical positions in industry.

Industrial News

1-2 Acid Safety Goggle



U. S. Safety Corporation 'Duo-Chem' Goggle

Light weight and genuine comfort are claimed by United States Safety Corporation for its acid safety goggle, called "Duo-Chem."

The goggle features a bright yellow vinyl frame, the American Standards Association color code for acids, which makes quick visual identification of the goggle possible.

Added comfort is assured through use of new materials, including soft vinyl frames and vinyl optical plastic lens.

The frame is soft enough to mold in a tight seal to facial contours and has resistance to acids and alkalis. Safe, adequate ventilation is provided by metal hoods over screen vents.

Another feature of the goggle is the replacability of the lens. It is optically correct and meets Federal Specifications for impact resistance.

Full protection for all chemical splashes and dusts is claimed for the product. The goggle will fit over regular glasses and is low cost.

For further information on the goggle, fill out a **Reader Service Card,** using number **1-2.**

Safety Committee Makes Plans

Plans were made for effective action to reduce accidents within the fertilizer industry when the national safety committee of the industry met in Chicago in December.

Committee chairmen named were: statistics and engineering, A. B. Pettit, Davison Chemical; Co. publicity, J. Lauren Shopen, Consumers Co-Op Association; program, John Smith, Spencer Chemical; Co. rules and regulations, Robert Fiser, Lubrizol Corp.

The national safety committee of the fertilizer industry was organized as a sub-group of the Chemical section of the National Safety Council during the National Safety Congress in Chicago in October. Organization officers, elected then, are: chairman, J. S. Fields, Phillips Chemical Co.; vice chairman, John Smith, Spencer Chemical Co.; secretary, Vernon S. Gornto, Smith-Douglas Corp.

Industry interest in the committee has been great, according to Floyd Van Atta, director of industrial hygiene for the National Safety Council.

"With its own organization formed and beginning to function," he said, "the committee's officers are confident it will become an independent national organization within a year. Plans are underway for the formation of sections within local safety councils. At least three state safety councils are expected to have fertilizer sections this year."

Industrial News

Marshall Appointed

The newly reorganized agricultural chemicals division of Commercial Solvents Corporation will be headed by Clyde T. Marshall, of Providence, R. I. Marshall recently was named manager of the division.

He will be located at the company's main offices, in New York City.

Clyde T. Marshall

The new division will concentrate on marketing CSC nitrogen products and insecticides. Plans for a new division, to be devoted entirely to CSC nutrition products will be announced next month, H. J. Henry, vice president in charge of the products division, announced.

Marshall has been vice president and marketing manager of Monowatt, Inc., an affiliate of the General Electric Company. He joined GE in 1928.

Marshall will supervise the marketing of the company's Dilan, BHC and ethyl formate insecticides. He will also be in charge of all Commercial Solvent nitrogen sales.

Wilson New Plant Head For Pennsalt in Texas

New superintendent of the Bryan, Tex., plant of the Pennsylvania Salt Manufacturing Company is Vance N. Wilson, who assumes duties formerly carried out by Howard L. Teer, district manager for agricultural chemicals.

Wilson's appointment was announced by William F. Mitchell, vice president in charge of manufacturing.

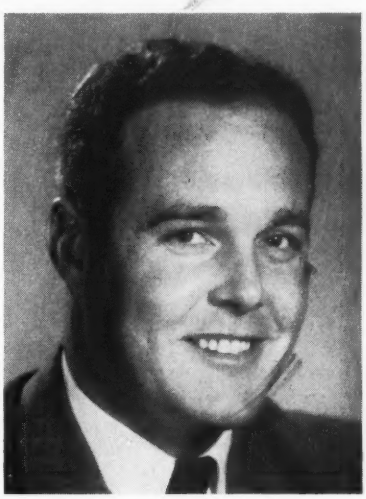
Appointment of the new superintendent makes it possible for Teer to devote all his time to selling.

The Bryan plant manufactures calcium arsenate and organic cotton insecticides and serves as a distribution point for other Pennsalt agricultural chemicals.

Before his new assignment, Wilson was supervisor of personnel administration in Pennsalt's Philadelphia office. He joined Pennsalt as a student trainee in 1941. He served in the Navy in escort and anti-submarine work in the Atlantic and Pacific from 1942 through 1946, leaving active duty as a lieutenant commander. Following the war he was tank car supervisor for the company until he joined the personnel staff.

Hough Representative

The Frank G. Hough Company has appointed Gene Thomas as district representative for Hough



Gene Thomas

sales district six, which covers the states of Washington, Oregon, Idaho, Montana and Wyoming.

He has been with the company for a year and a half training for the position.

Wanted: Reliable and experienced manager for fertilizer division. Know buying, formulation and plant operations. State salary expected. Address "360" care FARM CHEMICALS, Philadelphia 7, Pa.

How do you measure the look in a puppy's eye?

The preliminary precautions have been taken. A well-recommended kennel. A healthy litter. A breed that takes well to youngsters.

Now it's up to the boy to choose.

How will he decide? Perhaps by the look in a puppy's eye.

Chances are, you'll be buying Multiwalls soon again. You've done as every good buyer does. You've considered the reputation of the various suppliers. You've investigated the quality of their product. You've set down your specifications to the last fraction.

Now you pause to think again of the fellow who will make the final choice—your customer. How will he decide? One consideration may well be "the look in a puppy's eye." To say it another way, the sales appeal of your package.

Men who know Multiwalls . . . who buy more than 85 per cent of all Multiwalls made . . . give great weight* to good printing and design.

Union's art directors have concentrated experience. They know how to give your Multiwall package the look it needs to stand out among competition. Volume purchasers of Multiwalls recognize this. They are calling on Union for a greater share of their Multiwall needs.

More so every day . . .

IT'S UNION FOR MULTIWALLS

TRADE MARK UNION

*August, 1951 research study.

UNION BAG & PAPER CORPORATION • WOOLWORTH BUILDING, NEW YORK 7

How You Can Get

Free Information

On each of the two postage-paid postcards below you can request further information on four items described on this and the Industrial News section of this issue. *Fill out one quarter section for each item in which you are interested.*

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

1-1 Acid Safety Goggle
1-2 Mobile Crane
1-3 Bag Packer
1-4 Weight Records
1-5 Acid Handling
1-6 Taber Pump
1-7 Poidometer
1-8 Pyrethrum Concentrate
1-9 Pipe Fittings
1-10 Nonyl Phenol
1-11 Aerodyne
1-12 Butler Buildings
1-13 Triton Concentrates
1-14 Automatic Scale

1-3 Bag Packer

Bag packing costs can be cut by using the Auger-matic Bag Packer, the Coddington company states.

The unit quickly fills self-closing bags to the desired weight. It saves time in filling and eliminates the need for sewing or other expensive bag closing equipment.

It has a multi-twist auger which can be changed quickly to pack any material from powder to pellets.

1-4 Weight Records

Printed weight records at the instant of weighing are provided by Toledo Printweigh scales. This assures that the accurate indication of the dial will reach the accounting records without human error, the company explains in a catalog describing the scales.

A special floor scale with a recessed frame design guards fully against foreign material lodging beneath the platform edge. The double parallel link platform suspension means long life, and accurate dependability. The scales are available for every industrial use. They are described fully in the catalog.

1-5 Acid Handling

Personnel in farm chemicals industries should be interested in a material that will increase the life of equipment from two to twenty times.

Called "Carpenter Stainless No. 20," it is used in sulphonation or other processes which cause the formation of sulfuric, formic, acetic and other highly corrosive agents. Similar in analysis to "Durimet 20", the wrought stainless steel is produced in the forms of tubing, pipe, sheet and plate. Bar stock, wire and strip are produced by the Carpenter mill. The stainless steel is described in a 16-page booklet which contains technical data.

1-6 Taber Pump

The best way to handle concentrated

FILL OUT READER SERVICE CARDS

FARM CHEMICALS Code Number
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sulfuric acid is to use a Taber Vertical Type pump, the company states in a recently issued bulletin. The pumps are especially built for the purpose of cast iron and steel. The vertical design of the pump eliminates all stuffing box leakage because the stuffing box is located above the level of the liquid. For handling 20 per cent oleum the same type of pump is successful when constructed of steel.

1-7 Poidometer

All the functions in processing bulk materials, including weighing, feeding, blending, mixing, recording and proportioning are performed by Schaffer Poidometer, the company says in a new catalog.

The Poidometer is the machine that provides all the right answers for producers of crushed and granular materials. It works automatically and accurately, and furnishes a continuous record and a total weight-check whenever desired. The instruments are easily operated and durably constructed for sustained, economical service.

1-8 Pyrethrum Concentrate

Better knockdown and kill of flies, roaches, moths and beetles is claimed for Sulfoxide-Pyrescel, a new synergized pyrethrum concentrate developed by Penick & Co. It is a pyrethrum extract synergized with n-octyl sulfoxide or isosafrole.

The material has a low cost and has a light color and a mild odor. It is described as being of the same low order of toxicity as pyrethrum extract, and is said to be highly effective in sprays.

Information concerning the new concentrate is contained in a new bulletin of the company.

1-9 Pipe Fittings

The first complete line of corrosion-resistant fittings for use with light-walled schedule 5 pipe has been put out by Horace T. Potts Co. The company says the first cost of Speedline fittings is less than the cost for most fittings. The company makes an insert flange that is a corrosion-resistant serrated insert in a carbon steel flange. Only tools needed for assembly are a standard expander and an open end wrench.

Speedline elbows, tees, reducers, etc., are described in a company booklet.

1-10 Nonyl Phenol

One of Koppers series of alkylated phenols is useful to manufacturers of agricultural chemicals, the company says.

The material, nonyl phenol, is a slightly viscous, yellow to tan liquid that is only very slightly soluble in water. It is miscible with common organic solvents.

The product has a boiling range of 290–300° C, and a specific gravity at 30° C. of .940–.944. Further information is contained in a company booklet.

1-11 Aerodyne

There has been increased concern during recent years over the problem of dust control in farm chemicals industries. Most industries generate dust in one form or another and engineers are studying the various methods which control and tend to eliminate dust particles from the flow of air, gases or vapor. Development of the Aerodyne Dust Collector resulted from research in the field, Bowen Engineering Inc., says in a bulletin on its dust collectors. The collectors use the aerodynamic principle of separation, which accounts for the many advantages of the Aerodyne over other collectors, the company claims.

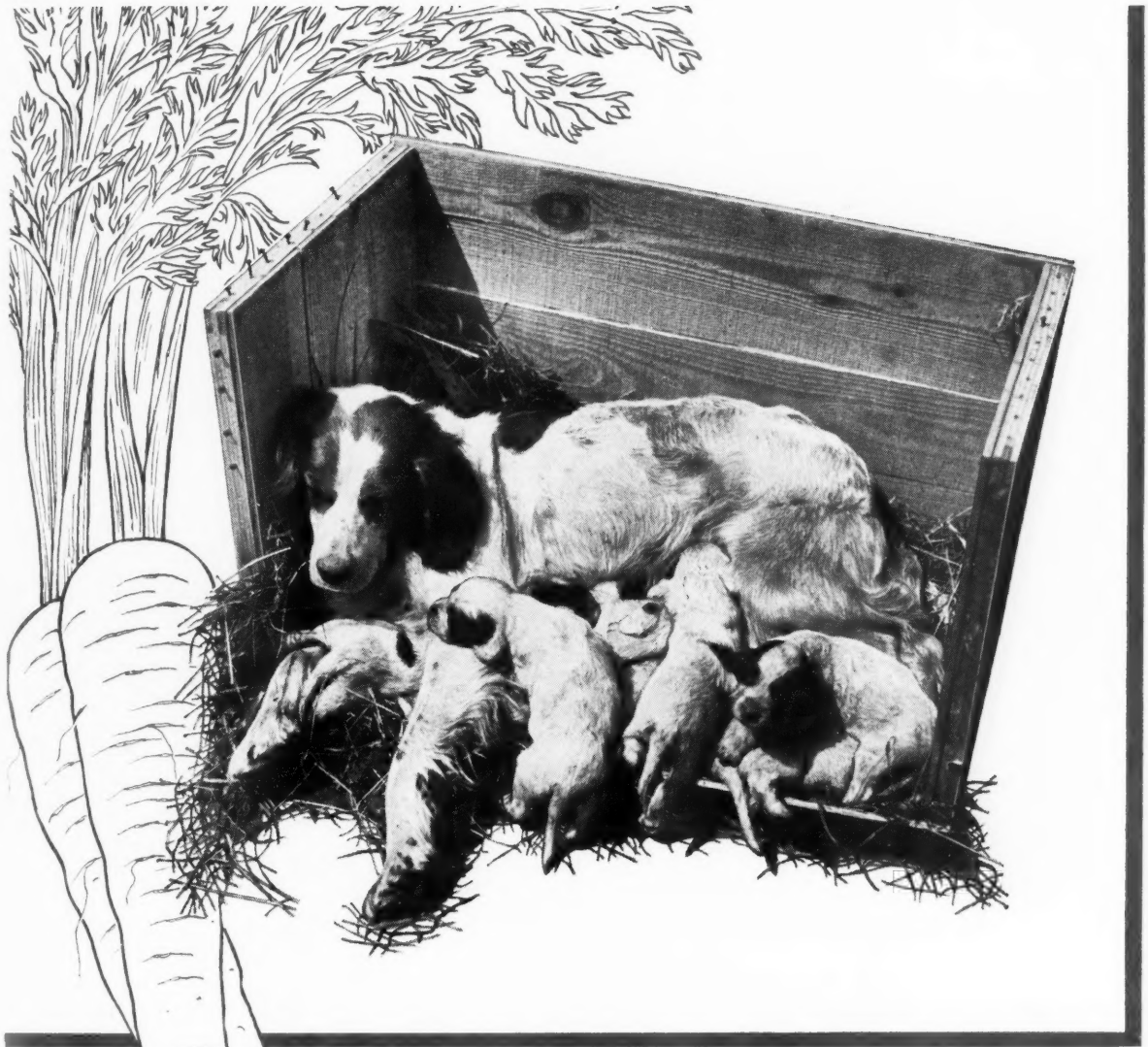
1-12 Butler Buildings

Considering new construction? You can build fast and at low cost with Butler buildings, the company states in a bulletin.

Chemical processing plants all over the country are using the buildings for new construction and expansion—for processing, packaging and storage facilities. Advantages of the buildings are low cost, speed of construction, adaptability and wide range of sizes. The buildings are fire-safe, weather-tight and wind-resistant.

1-13 Triton Concentrates

Both aldrin and dieldrin are readily compounded into emulsifiable concentrates with tritons, a bulletin printed by Rohm and Haas states. Formulas for the pesticides are furnished in the bulletin designed primarily for emulsifiable concentrates useful in cotton insect and grasshopper control. Most formulators will be interested in the concentrates presented in the bulletin for the two chemicals. Information and formulas in the pamphlet are based on company research.



A WHOLE FARM THRIVES ON NOURISHMENT

Pigs . . . cattle . . . wheat . . . a farm is growing 24 hours a day.

This means an enormous drain on the rich plant-food elements within a farmer's soil. For these soil ingredients provide the basic starting point for the nourishment of plants, animals . . . even man.

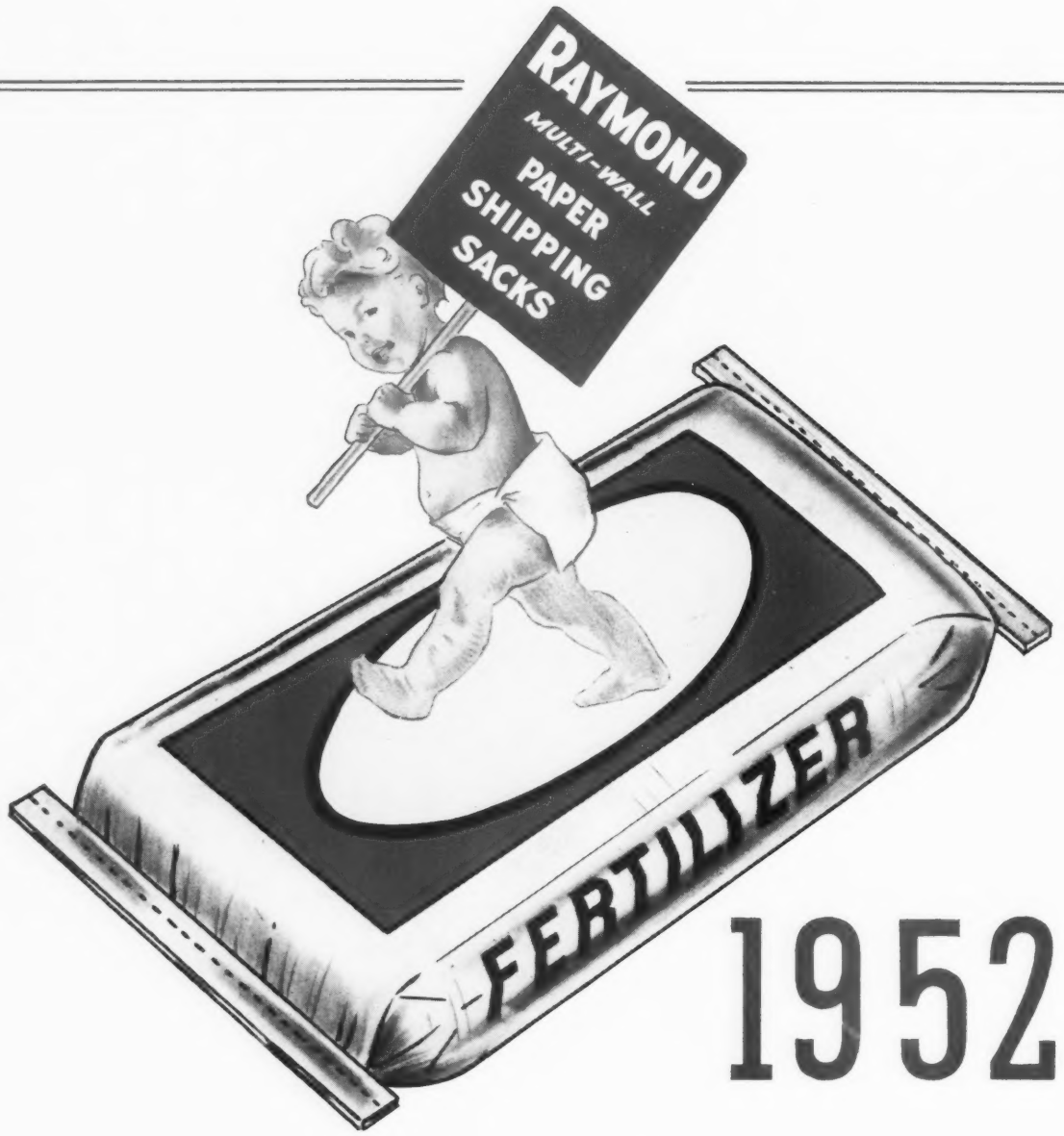
Many of the most effective soil-replenishing fertilizers contain POTASH . . . often Sunshine State Potash, a product of New Mexico. Such fertilizer is *more* than a mere soil nutrient. It strengthens the crops . . . effectively helping them to resist disease and drought.

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.

Reg. U. S. Pat. Off.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 48/52% K_2O
MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.



1952

Again, in 1952, carloads of fertilizers will be packed and shipped in . . .

RAYMOND MULTI-WALL PAPER SHIPPING SACKS

These tough, strong, dependable Raymond Shipping Sacks are CUSTOM BUILT to specifications.

They are manufactured in various types, sizes, and strengths. Available printed in multi-colors or plain.

Raymond Multi-Wall Paper Shipping Sacks are made of one or more walls of heavy, specially prepared Kraft paper, with sewn or pasted end, valve or open mouth. This construction assures ample protection to contents from tears, snags, moisture penetration, and rough handling. They're DUST-PROOF! SIFT-PROOF! WATER-RESISTANT!

Make 1952 a banner year. Pack and ship your products in Raymond Multi-Wall Paper Shipping Sacks—*the quality Shipping Sacks that always make a good product better.*

THE RAYMOND BAG COMPANY, *Middletown, Ohio*

The CUSTOM BUILT Fertilizer Shipping Sacks

Industrial News

New Davison Appointees

Finley C. Nicholson

David N. Hauseman

Finley C. Nicholson and David N. Hauseman recently were appointed to fill positions in the Davison Chemical Corporation.

Nicholson was named to the newly-created post of manager of operations. He will be in charge of all company operations, except for the mixed fertilizer division.

Nicholson is a graduate of Purdue University, where he studied chemical engineering. He joined Davison in 1942.

Hauseman, a retired brigadier general of the Army, was appointed a marketing executive of the company. He resigned as president of Houdry Process Corp., of Philadelphia, to take the post.

Hauseman received a B.S. degree in economics from the University of Pennsylvania in 1918, a B.S. in mechanical engineering from Massachusetts Institute of Technology in 1928 and a master's degree in business administration from Harvard University in 1935.

He served for 29 years in the Army, being retired in 1946. He was elected to the position of executive vice president of Temple University in 1946, and later was elected to the board of directors and made president of the university's research institute.

Gibbs on Point 4 Assignment

George P. Gibbs, soils scientist of the USDA, left Jan. 4 for a Point Four technical cooperation assignment to Costa Rica. The appointment was made at the request of the Government of Costa Rica to the Technical Cooperation Administration, Department of State.

Gibbs will assist the Costa Rican Government in establishing a soils laboratory and in the reclamation and development of approximately 150,000 acres of land in the Tempisque River Valley.

From 1935 to 1945 Gibbs served as a soils technician on erosion control and land use for the Department of Agriculture's Soil Conservation Service. Since 1946 he has been engaged in land classification work for the Department of Interior's Bureau of Reclamation.

Gibbs, a native of Forestville, New York, received his B.S. degree from Cornell University in 1935.

Soil Specialists Meet Feb. 22

Soil specialists from 13 states will discuss the latest developments in fertilizer research in the Middle West at the annual meeting of agronomists and fertilizer industry representatives scheduled for February 22 in the Palmer House in Chicago.

The soils men will be welcomed by J. D. Stewart, of Louisville, president, and Z. H. Beers, Chicago, executive secretary, of the Middle West Soil Improvement Committee, which is sponsoring the meeting.

Dr. Garth Volk, head of Ohio State University's agronomy department will preside.

Among research men presenting reports will be F. W. Smith, Kansas State College; W. P. Martin, Ohio State University; George Stanford, Iowa State College; E. B. Norum, North Dakota University; H. F. Rhoades, University of Nebraska; K. C. Berger, University of Wisconsin and R. L. Cook, Michigan State College. Reports will also be presented by soils men from Indiana, Missouri and South Dakota.

The reports will cover fertilizer work on wheat, oats and corn; fertilizing pastures; corn and rotations; time, rate and method of applying fertilizer; effect of climate on the response of small grains to phosphate fertilizer; prospective nitrogen needs in the years ahead and plant nutrient deficiency.

A question and answer period during the afternoon session followed by a report compiled by the agronomists covering recommendations of fertilizer grades for each state in the year beginning July 1, 1952, will be included.

Beers stated that in addition to the agronomists and fertilizer industry men who will be present, representatives of companies in the farm machinery, equipment, supplies and transportation industries will be welcome to attend.

BUYERS' GUIDE •

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AGRICULTURAL CONSULTANTS
Bailey & Lerch, Washington, D. C.

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Barrett Div., Allied Chemical & Dye Corp., New York City
Commercial Solvents Corp., New York City
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

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Bemis Bros. Bag Co., St. Louis, Mo.
Mente & Co., Inc.. New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton
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International Paper Co., Bagpak Div., New York City

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Schmutz Mfg., Louisville, Ky.

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Atlanta Utility Works, The, East Point, Ga.
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American Agricultural Chemical Co., New York City
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McIver & Son, Alex M., Charleston, S. C.
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Commercial Solvents Corp., New York City
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Powell & Co., John, New York City
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Virginia-Carolina Chemical Corp., Richmond, Va.

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MACHINERY—Grinding and Pulverizing
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ANTICIPATED PRODUCTION DATE

LATE WINTER OR EARLY SPRING, 1952.

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DUVAL POTASH *FOR BETTER PRODUCTS OF FARM AND FACTORY*

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BUYERS' GUIDE

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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

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MACHINERY—Power Transmission
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NITROGENOUS ORGANIC MATERIAL
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Jackle, Frank R., New York City
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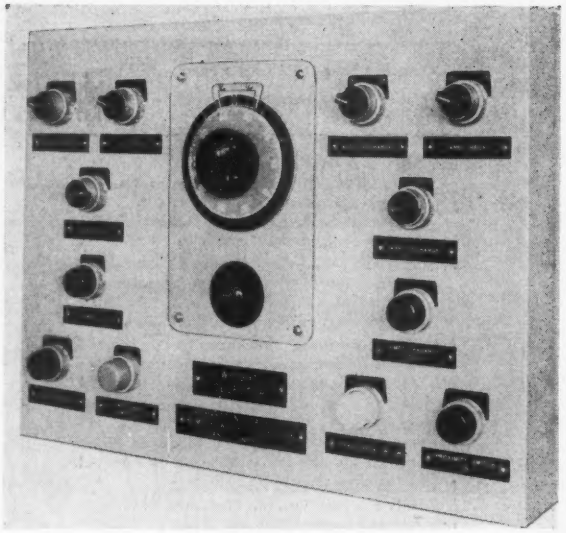
Monarch Mfg. Works, Inc., Philadelphia, Pa.

Alphabetical List of Advertisers



One Does Work of 12:

Automatic Scale

One automatic scale accomplishes the work formerly requiring 12 separate scales, if the Select-O-Weigh scale is used.

Now even the smallest farm chemicals plant can afford to use an automatic scale, the Richardson Scale Company explains.

Through application in a novel manner of a simple servo-mechanism, extensively used in processing controls, the company has developed truly automatic cumulative and consecutive weighing. It guarantees complete flexibility in formula variation for all proportioning operations, from the largest to the smallest.

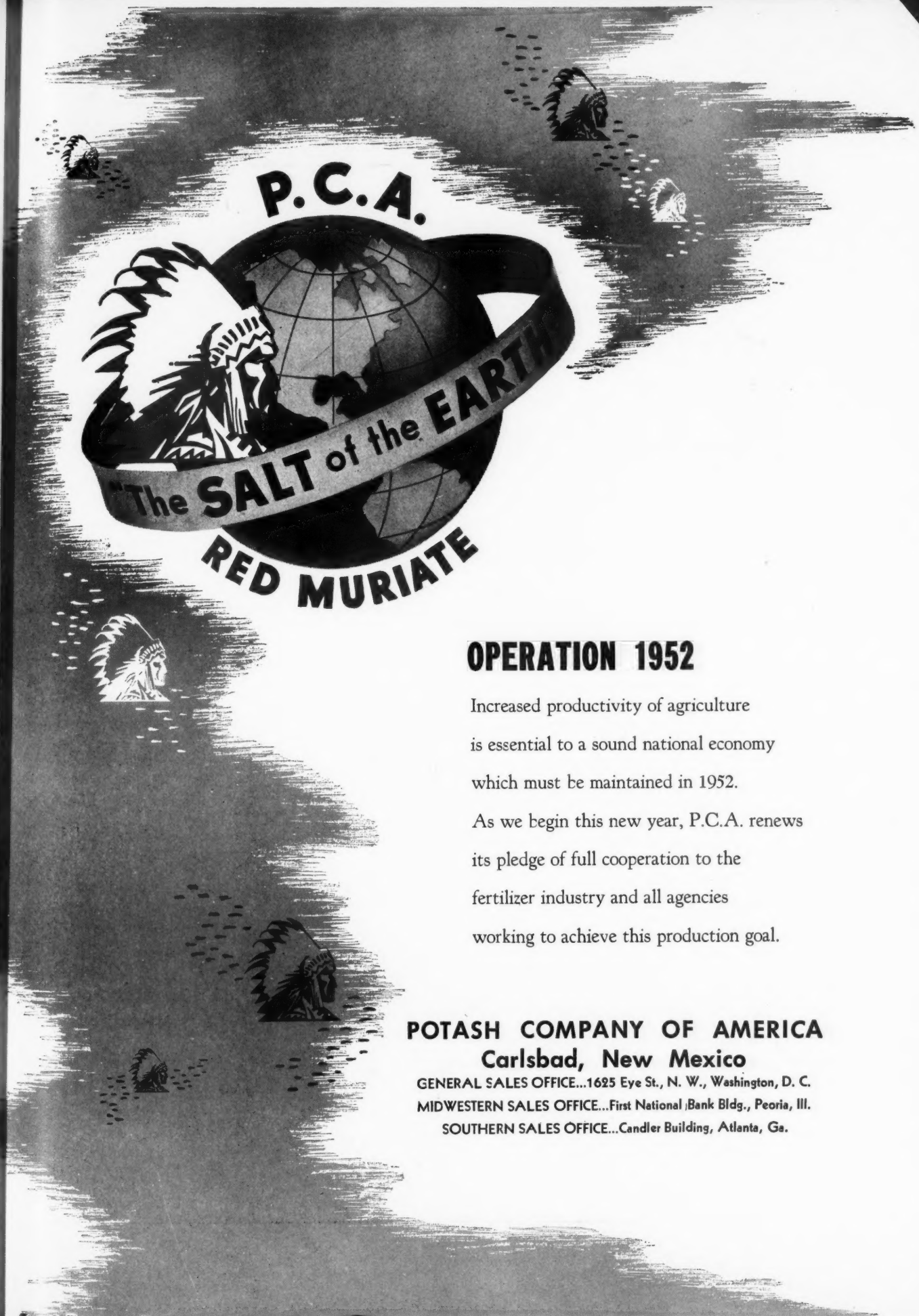
The heart of the scale is a simple, electronic current with no arcing contacts, making it perfectly suited to explosion-proof installation. A standard type Richardson automatic scale is used as the weighing element in the system, with a pendulum dial acting as the force-measuring component. The great number of dial scale settings makes possible great versatility of operation as well as a wide range of capacities.

Operation of the scale is simple: A master control panel is built to include as many setting dials as there are ingredients in the formulae handled.

The scale operator sets each dial on the control panel to correspond with the actual amounts of each ingredient in his formula.

After setting up the control panel, the start button is pushed. This actuates the screw feeder mechanism, delivering the amount of material set on the first control dial and then stopping. The cycle is repeated for the other ingredients, in accordance with the other dial settings.

For further information on the Select-O-Weigh, fill out a **Reader Service Card,** using number **1-14.**



OPERATION 1952

Increased productivity of agriculture
is essential to a sound national economy
which must be maintained in 1952.
As we begin this new year, P.C.A. renews
its pledge of full cooperation to the
fertilizer industry and all agencies
working to achieve this production goal.

POTASH COMPANY OF AMERICA
Carlsbad, New Mexico

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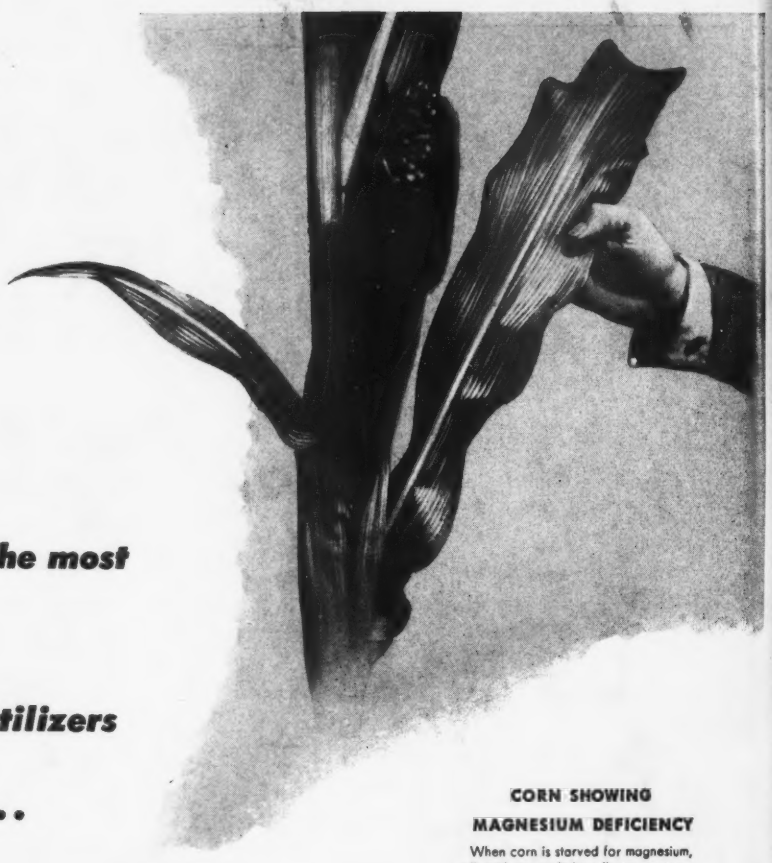
MIDWESTERN SALES OFFICE...First National Bank Bldg., Peoria, Ill.
SOUTHERN SALES OFFICE...Candler Building, Atlanta, Ga.



CORN SHOWING MAGNESIUM DEFICIENCY

When corn is starved for magnesium, yellowish-green, light yellow or even white streaks develop between the parallel green veins in the leaves.

Fourth in a series of six advertisements showing magnesium deficiency symptoms in tobacco, cotton, grapefruit, corn, potatoes and oats.

You can supply magnesium in the most effective way in mixed fertilizers with..

Sul-Po-Mag®

Water-Soluble
Double Sulfate of Potash-Magnesia

Farmers in the territory you serve who are not getting the quality and yields of crops they want because of magnesium deficiencies in their soils need your help. These farmers who need magnesium can get it in the most practical and economical way in the form of *soluble magnesium* in mixed fertilizers.

Leading fertilizer manufacturers in most major farm areas are using *Sul-Po-Mag* in grades designed for crops grown on magnesium-deficient soils.

Sul-Po-Mag, mined and refined exclusively by *International*, is a properly balanced combination of potash and magnesium, both in soluble form. It is available in the tonnage you need for mixed fertilizers or bagged for direct application to the soil.

SUL-PO-MAG (Water-Soluble Double Sulfate of Potash-Magnesia)
MURIATE OF POTASH **SULFATE OF POTASH**

THIS IS WHY GROWING PLANTS MUST HAVE MAGNESIUM

- **It is required in the life process which gives plants their green color and keeps them growing.**
- **Promotes earlier maturity on soils low in magnesium.**
- **Enables crops to make better use of other plant foods.**
- **Carries phosphorus to the growing and fruiting parts of the plant.**
- **Necessary for the development of seed.**
- **Promotes the formation of proteins in growing crops.**
- **Stimulates growth of soil bacteria and fixation of nitrogen by legumes.**
- **Increases the plant's resistance to diseases.**

WRITE TODAY FOR YOUR FREE 

COPY OF THIS NEW BOOK

POTASH DIVISION International Minerals & Chemical

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